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EDITORIAL.

THE FATAL ACCIDENT at Bingham, caused by the contact of a surveyor's tape with an electric wire, conveys a warning which should not go unheeded. Two good men were killed, and it is obvious that such an accident might well have befallen any one of the surveyors who carry out their engineering duties in workings along which live wires are strung. It appears that no one thought of the wires transmitting power from the Provo river to Bingham as a source of danger; least of all, that the touch of a surveyor's tape would short-circuit the current. Mining engineers encounter sufficient dangers that cannot be foreseen; it is well that they should be protected against those which are preventable.

LAST WEEK in these columns we referred to Mr. Wm. Heywood as manager of the Tennessee Copper Company, the fact being that he is superintendent of the smelter; for the error we, and not Mr. Heywood, are responsible. Mr. Randolph Adams, formerly at Broken Hill, is the manager; he was also in large part the creator of the enterprise, being among the first to realize the possibilities of the Tennessee copper deposits.

THE QUESTION of the causes producing miner's phthisis is again to the front, and it is well that it should be so. Both on humanitarian and economic grounds this ailment of those who use rock-drills underground warrants the most thorough investigation. Medical men appear to concur in the view that the sharp edges of the dust, especially when derived from crystalline igneous rocks, cut the tissues of the lungs so as to reduce their vitality and pre-dispose the miners to attacks of the tubercle bacillus. The effects are similar to those of steel particles in file works and dust in the stone mason's trade. Acute miner's consumption has only assumed prominence since the introduction of power drills, which produce a far greater amount of dust than when the work is done by hand. Moreover, in the hurry to push forward exploitation, insufficient time is given for the dust to settle after blasting. The spraying of the dust during drilling, and after blasting, is a subject

which will, we trust, command further attention on the part of our professional men.

THE REPORT OF THE Tennessee Coal, Iron & Railroad Company, given on another page, shows that the company has used the large profits of two prosperous years, chiefly in strengthening its position as a producer. Nearly all of its blast furnaces have been rebuilt, improved methods adopted in its ore and coal mines, and the Ensley steel works made a plant of high order. This policy of improvement has been adopted by other southern companies, with the result that iron making in the South is now in better position than it has ever been. The success of the Ensley steel plant is especially gratifying, as showing that the South need not depend entirely upon the foundry to support its iron industry, but can compete successfully in the markets for steel and finished materials.

THE PROJECTION at the summit of Mont Pelé—it is no longer spelt Pelée—which rose to a height of 600 ft. above the old summit of the mountain, promises to be one of the most interesting features in the study of that volcanic vent. According to Heilprin, Hovey, Lacroix and other observers, it was thrust up through the crater at the rate of as much as 41 ft. per day, until it stood up as a shark's tooth or obelisk far above the old cone. Professor Lacroix, who headed a commission from the French government, decided—nearly a year ago—that it was an exceedingly viscous acid lava which had solidified on extrusion, and rose vertically, instead of flowing out of the crater in the normal manner of lava-streams. Now, however, Professor Angelo Heilprin states that this towering mass is none other than the ancient core of the volcano loosened from place and pushed up bodily by the energy at the volcanic orifice. When access can be obtained to the crater so as to obtain fragments of the rock of which this huge projection is built up, it should be possible to decide by microscopic investigation whether the rock is a rapidly cooled viscous lava or a slowly cooled volcanic plug. The solution of the problem will throw much light on the physiology of volcanoes.

SOME CONTROVERSY is going on in England upon the supposed inferiority of rails made from basic steel to those manufactured from bessemer metal. A prominent firm, Cammell, Laird & Company, some time ago issued a pamphlet in which they endeavored to show that breakages of rails have been much more frequent where basic steel rails are used. Their evidence, however, is not accepted by engineers, and it is pointed out that the use of basic steel for rails is almost universal in Germany, and that no inferiority has been found there, the rails being fully up to the standard. The dispute seems to be more a manufacturer's argument than anything else.

In this country there will soon be an excellent opportunity for testing the relative merits of the different materials. The Tennessee Coal, Iron & Railroad Company is turning out, from its Ensley works, a large quantity of rails made from basic open-hearth steel. These rails will be laid on the Louisville & Nashville and on the Southern railroad, where they will be used side by side with bessemer steel. Any difference in the wear and strength of the rails will quickly be noted, under the best conditions for a test.

THOSE WHO sample mines, the valuable ores of which are in the form either of gray copper (chalcocite) or of horn silver (cerargyrite), must take particular care not to get high and incorrect results. Both these minerals are apt, in the final quartering down, to become concentrated. This advice is based on actual examples of errors made recently by men of ability.

DIVIDEND PAYMENTS by the mineral industry in America have been exceptionally good in May, and with 12 companies less reporting, the April record has been doubled. In all 48 companies, tabulated by the ENGINEERING AND MINING JOURNAL, declared in May dividends aggregating $10,612,931. Over 80 per cent of this was contributed by four copper companies, lead by Amalgamated's quarterly dividend of 0.5 per cent, and three iron and steel concerns, lead by the United States Steel Corporation's quarterly preferred of 1.75 per cent. The surprise was a reduction in the monthly dividend of the Daly-West mine, in Utah, from 65c., paid since last September, to 40c., which will result in a difference of 15 per cent per annum on the company's share-capital of $3,600,000. This reduction has been made necessary by the knowledge that the ore reserves in the mine are depreciating and that further drawing on the high-grade ore to meet heavy dividend payments would result disastrously for the company. To counterbalance the Daly-West dividend cut, Ophir, of Nevada, has doubled its payment by $25,200, Bunker Hill & Sullivan, of Idaho, has increased its monthly rate by $15,000, and two new oil companies in California have come forward with $7,750. In detail the May dividends were: Four copper companies, $1,630,215; 20 gold, silver and lead, $672,296; three zinc, $301,915; three iron and steel, $6,899,206; three coal and coke, $526,944; 13 oil and gas, $484,605; two chemical and mineral companies, $97,750; total $10,612,931.

In addition to the above, eight Mexican mines and metallurgical works paid in May $471,881, of which Greene Consolidated Copper, owned principally in New York, contributed $259,200 as a 3 per cent dividend.

BEWICK, MOREING & COMPANY.

The Australian papers contain references to a matter which is also arousing comment in London, namely, that the number of mines now controlled by Bewick, Moreing & Company threatens to constitute a dangerous monopoly in Western Australia. At Perth and Kalgoorlie the politicians are making the most of local jealousy for their own purposes, counting on the support of the retail merchants whose trade in mine stores is suffering through the wholesale purchases made by the company for the mines which it directs. This attack will amount to nothing unless the insidious introduction of political clap-trap should give it strength; as it is now, it is merely "the baby act" of men whose interests have suffered by reason of the company's effort to push economy at the mines into the department of stores and machinery. It is much like the objection of the Bendigo man to rock breakers. He held these devices as undesirable because they would throw a number of nice young men out of employment; ignoring in his muddleheaded reasoning that every decrease in mining costs rendered available a bigger tonnage of ore, with its corollary of employment for a larger number of workmen

In London, the complaint is made that "B. M. & Co." are getting hold of the technical direction of mine after mine, until Western Australia is almost managed from their office. When they secure the management of mines they naturally appoint their own men, and thus managers—some of them good men—lose their positions, not always perforce, but often from a reasonable dislike to becoming subordinate. This has stirred up some jealousies and a little feeling, much of which is the inevitable penalty of a success secured at the expense of other people. In regard to this aspect of the matter we think that there is a natural cure which will begin to operate as soon as Messrs. Bewick, Moreing & Co. have exceeded their capacities. After all, Messrs. C. A. Moreing and H. C. Hoover can give their time and ability only to a limited number of mines, however ably they may be seconded by their staff; the executive skill which has given the firm such well-deserved distinction will be frittered away if spread over too large a number of mines; but so long, for instance, as they can take charge of a mine and bring costs down by one pound sterling, equivalent to one-quarter of an ounce of gold, per ton, so long will their services be in request In the meanwhile the healthy rivalry now manifest in Western Australia is an unmixed good to the industry, for it has reduced the costs and augmented the profits of mining in a manner which has given new life to the Westralian gold-fields, it has raised the investment value of the shareholders' property and has done honor to the mining profession, the members of which have accomplished such results. It is credit won by the engineer from the incompetent director, it is profes-

sional skill as against untechnical stupidity. Our sympathies are with the firm which is now arousing antagonism, and we trust that they will avoid the two obvious perils of people in their position, namely, trafficking in shares and biting off more than they can comfortably assimilate.

COLLATERAL EVIDENCE.

When sampling is impossible, either through want of time or lack of money, an engineer must fall back on his other resources. By studying the mine maps, or, if there are none, by similar observation underground, one can get at the behavior of the ore, that is, its distribution, however irregular, when viewed on a large scale. Then, by examining the working faces, by observing which are being stoped for the mill, by noting whether raises and winzes are carried in the richest portions or at regular intervals, by questioning the foreman and shift-bosses, and by inquiring into the past history of the property and the plans of the manager for its future development, one can acquire a large amount of collateral evidence, out of which, with the aid of a cool judgment and a certain familiarity with the dark corners of human nature, it is possible to sift the vital facts pertaining to the case in hand. After that, if no key to geological structure or light from experience elsewhere is at the engineer's disposal, he had better decline to state a positive opinion, or else arrange to sample systematically. The mines in which sampling is of no service are rare, although those which can be diagnosed by sampling alone are in the minority. As a rule, even amid the most sporadic distribution of ore, there is some clue to be found, either by a little intelligent testing of different kinds of ore and rock, or by observing niceties of structure.

Prospects obviously afford but little data bearing on the possibilities of future development, and irregular shoots of ore give contradictory evidence which is almost as bewildering as none. The logical method is, then, best expressed by simile; an infant is a human prospect; you judge it by its own evidence of strength and health, but you infer much from parentage and environment. So, with a mine, the surrounding geological conditions, the manner of discovery, the mineralogical constituents of the ore, are all as important as mere richness and width of lode. A mine with irregular ore-bodies is like a boy with contradictory traits, yet you do not despair of appraising his future; you judge by other members of the family, by his better tendencies, by the development of faculties and the amenability to discipline. So, underground, you can infer from the record of adjoining mines, from the character and changes in the ore as water-level is gained, from the relation between rock structure and lode behavior, whether the ore-shoots are to remain uncertain and unsatisfactory or whether they will, with further depth and development, afford the making of a good mine.

ELECTRICITY AT PENNSYLVANIA COAL MINES.

Though the use of electricity underground in gaseous mines is opposed by the chief of the Bureau of Mines of Pennsylvania and though district mine inspectors sometimes refuse to sanction the installation of electric motors, yet there has been, within the past five years, a notable growth in the use of electricity at Pennsylvania coal mines, and this growth will undoubtedly continue.

Two objections are frequently cited to the introduction of electric machinery, namely, the lack of a sufficient supply of labor competent to keep such machinery in good adjustment, and the difficulty and cost of repairing serious injuries or replacing broken parts. Both these objections are loosing force. Large coal mining companies now have thoroughly competent electrical engineers under whom are employees that can set up a motor or string wires properly. With the steady increase in the use of electric motors for coal cutting, pumping and haulage the ordinary miner is developing the willingness and skill to keep such equipment in good condition. Moreover, the cost of repairs has been greatly reduced by the practice, on the part of large companies, of employing efficient repair men and equipping the machine shop with everything needed for re-winding armatures, trueing commutators, and the like.

Beyond these two objections, now disappearing, to the introduction or wider use of electricity there remain only the liability to fire from defective insulation and the danger of explosions in gaseous workings. The last objection is admittedly serious and we fancy few advocates of electrical equipment will advise the installation of electric haulage for entries and rooms where the use of the safety lamp is imperative. On the other hand, if ventilation is as good as it should be, the danger zone may be limited and the area available for electric motors becomes correspondingly increased. The possibility of fire from defective insulation, while admittedly a risk, is often exaggerated. It is probably a less serious menace than the ordinary miner's lamp, which, in careless hands, has started so many mine fires.

The work done by electric motors at Pennsylvania collieries covers nearly all the operations of mining and preparing coal. In the bituminous region there are tipples where the chain-hauls, the crushing rolls and conveyors are driven by electric motors, while electric carriers supply blocks of coke-ovens. The largest individual coal-washing plant in the State is to have an electric equipment. In the anthracite region the Delaware, Lackawanna & Western Company has a small electrically equipped breaker in operation, and is preparing to start work on a very large breaker similarly equipped. The Delaware & Hudson Company is to use electric motors in a medium-sized breaker near Wilkes-Barre. Mine fans of large capacity are now driven by electric motors. When fans are situated some distance from a boiler plant the economy, compared with a steam line, is considerable, and more fans would be so driven but for the conservatism of mine inspectors.

The use of electric locomotives underground, where conditions are favorable, is on the increase in both the anthracite and bituminous regions. The General Electric, Jeffrey and Westinghouse companies have built locomotives with a reel carrying several hundred feet of insulated cable by which a locomotive can run up into rooms or headings where no trolley wires are strung. For grades of from 3 to 20 per cent an electrically-propelled rack-rail locomotive made by the Morgan Electric Machine Company has given excellent results at some mines in the Clearfield region, and several manufacturing companies are preparing to build locomotives of somewhat similar type.

Coal-cutting machines are not used in the anthracite region, though electric drills for rock work are being given a thorough test in the Scranton district. In the bituminous regions electric undercutting machines are in common use.

The use of electricity for pumping calls for some comment, in view of the development of the multi-stage centrifugal pump for high heads. The Worthington company is putting out such a pump on which it guarantees high efficiencies even for heads of over 1,000 ft. At present some large horizontal plunger pumps in the anthracite region are electrically driven; in the bituminous regions triplex electric pumps are often seen. While slope hoists electrically driven are fairly numerous in the anthracite region, there are as yet no mines in the State using electric hoists in the main shafts. However, the great water-hoist of the Delaware, Lackawanna & Western Company near Scranton is to be equipped with electric motors, and will be an advance over anything in this country or abroad, in view of the heavy duty required.

MARKET CONDITIONS.

June 1.

The metal markets continue very quiet, with business on a moderate scale, and a somewhat easier tendency all around. Copper has been selling only in a moderate way for home consumption, though the foreign demand seems to have improved again. Tin is quiet, with much lower quotations, and a consumptive demand which is not above the ordinary. Lead is understood to be accumulating to some extent, and the chief seller has made another reduction of $2 per ton, this making a drop of $4 within the last three weeks. Spelter is also in moderate demand, and there has been a

considerable break in quotations. Galvanizers are buying on a small scale only. The Joplin ore market shows a weakening tendency, and the miners are talking about stopping production, or restricting it, to maintain prices.

Silver has been fairly steady, with only moderate changes in price. There is some buying for India.

The iron markets continue very dull, with light business and a continued tendency to lower prices. Consumers are not buying ahead to any extent, and business for the third quarter is still doubtful. Ther is some talk of export trade, but the parties engaged are keeping very quiet about it.

The Western coal markets are still dull, and upon the whole weak. Lake business has not opened yet, and there are no signs of a termination of the strike which holds vessels.

The anthracite trade is somewhat less active, urgent orders being about filled. Steam sizes are being stored owing to lack of demand.

The seaboard bituminous trade still continues to show a dull market, with no signs of improvement in the near future.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

At the mouth of the Tees, where salt was discovered in 1862, the beds cover 20 sq. miles, and each square mile is estimated to contain 100,000,000 tons of salt.

In 1803 the United States coined $258,377.50 gold, and $87,118 silver. One hundred years later, in 1903, the coinage was $43,683,970.50 gold, and $19,874,440 silver.

The turquoise is derived chiefly from Persia, where it occurs in seams as wide as 6 mm., or in irregular patches in the brecciated portions of a porphyritic trachyte and clay-slate.

At certain foreign steel works chrome ore in lump form is used for patching the sides of the basic-lined furnaces, and is found more convenient and serviceable than a slurry of dolomite. Chrome bricks and cement are also used to advantage.

The alloy nickel-steel, containing 37 per cent nickel, after special heat treatment, is subject to expansion from ordinary atmospheric temperatures to a very inappreciable degree, and is therefore of extreme value for chronometric and other apparatus in which the maximum of accuracy is essential. The dilation per degree Fahrenheit is reported to be only 1-36 in. per mile.

Aluminum, as a conductor of electricity for lighting and power transmission, is gaining in favor. In one year nearly 800,000 lb. of aluminum wire, representing fully 500 miles, was purchased by two prominent electric companies in New England. Similarly large orders have been placed by other affiliated concerns. The weight of aluminum as rolled, compared with copper, is as 162 to 555 lb. per cu. ft., and the cost as 3 to one.

THE VALUE OF RESEARCH.*

By S. LAWRENCE BIGELOW.

The reproach is sometimes made by those who know little of science, that much of the research work done is useless from the practical point of view, and results only in scientific curiosities. Such curiosities were cerium and thorium at one time, but now we have the Welsbach gas mantle. The scientific curiosity of to-day is very apt to become the household necessity of to-morrow. A friend once watched Faraday in his laboratory for a while, and then asked him of what use such work could be. Faraday immediately replied with the question, "Of what use is a baby?"

It is not impossible that the objection might be raised that many of the newest inventions at least are patented, and that then tribute is levied in the shape of royalties. This is true, and it is somewhat unfortunate, also, that in the majority of instances the wrong man gets the royalty. A law of nature is not patentable, but the application is, and so it comes about that the real discoverer, retiring and absorbed in his science as he must be to produce his intellectual marvels, is overlooked by the public, overshadowed by some one who happens to find a patentable application of a discovery in which he took no part. It is worth pondering a moment that practical and patentable are not synonymous terms. It is far from my intention to imply that the patentee does not deserve his royalties; he unquestionably does, and fills an important and necessary function in the social economy.

In any case, such tribute as is levied in this way is but a small fraction of the worth of the invention, and the public always gets a good bargain. The actual value, in dollars and cents, of that portion of the fruits of scientific labor which is given for nothing is hard to estimate, but perhaps we may get a notion of it by analyzing one specific case. Suppose some one unprincipled individual obtained an absolute and unquestioned monopoly of all telephones to-morrow. Suppose him to be under no legal restraint, and that he proceeded to squeeze every user of a telephone as hard as possible. It is safe to predict that single business firms would pay him thousands of dollars, rather than lose that indispensable adjunct to their facilities for carrying on their work. Add together all that he could possibly get in this way from all over the world, and subtract from this total the amount now being paid, and we shall get the value of one little gift of science to mankind. Is it extravagant to estimate this one item as exceeding the total cost of all educational institutions since the dawn of civilization?

Let me put the question in another form: What is the total value of all the time saved by telegrams and by our present means of transportation? And again, how much would you pay for enough antitoxin to save your child from death by diphtheria? These things are inestimable, and my original statement stands proved.

Professor Dewar drew a particularly illuminating comparison about a year ago. He wished "to find out exactly what some definite quantity of scientific achievement has cost in hard cash." He found that "the total cost of a century of scientific work in the laboratories of the Royal Institution, together with public demonstrations," was £119,800. This is the price which was paid for all the achievements of Young, Davy, Faraday, Tyndall and Dewar himself. No wonder that Dewar reaches the conclusion "that the exceptional man is about the cheapest of natural products." We may sum all this up by saying that it is impossible to fix the value of the results obtained by research workers in laboratories, for the simple reason that they have been the creators of nearly everything that makes money worth having.

*Portion of an address delivered at the dedication of Palmer Hall, Colorado College, February 22, 1904. Abstracted from *'Science,'* April 22, 1904.

AN UNUSUAL FATALITY.

The accidental electrocution of the two surveyors at Bingham, Utah, last week is deserving of some attention. While the attendant circumstances were so unusual that its repetition seems almost beyond the bounds of probability, it, nevertheless, points to a danger which needs to be appreciated all the more because the manifestations are subtle and often unexpected.

It appears that the two men, Adolph Jessen and Hugh Allred, were engaged in running a line for a placer claim on the hillside above Bingham cañon. Nearly at right angles to the line were strung the wires of the Telluride Power Company which supply the town of Bingham with light and power. At the time of the accident Mr. Jessen was standing on the hillside, his feet being about on a level with the wire. Mr. Allred was below the wire, his head being lower than Mr. Jessen's feet. The steel tape was stretched on the ground between them. In some manner it became fastened in a clump of bushes near the wire and in attempting to loosen the tape Mr. Jessen gave it a jerk. Instantly the tape rose from the bushes, and came in contact with the electric power wire. There was a bright flash at the point of contact, the two men's bodies forming a short circuit. Mr. Jessen received a sufficient amount of the 5,000 voltage to cause instant death, although he stood on a rock. Mr. Allred, who stood upon wet ground, received the majority of the voltage.

Several persons were near the scene when the accident occurred and medical aid was soon secured, but it was of no avail. Except for a few burns on the hands and feet the bodies of the victims showed no marks of injuries.

GERMAN WHITE LEAD COMBINATION.—In expectation of improving the market price of white lead, and to better control the increasing production, 16 of the leading manufacturers have formed a selling agency known as the Bleiweiss Verkaufskontor, with headquarters at Cologne. The agreement has been signed by W. Leyendecker & Co., F. W. Remy & Co., Bopp & Odernheimer, J. Beckers & Co., Loelle & vom Hofe, W. A. Hospelt, Chemische Fabrike Freiwienheim, C. A. Lindgens, Lindgens & Son, Bruch & Co., August Herder, Bergmann & Simons, Gebrüder Kolder, Farbwerke Aktien-Gesellschaft Düsseldorf, Raderschatt & Co., and Deus & Moll. In recent years the trade has been demoralized by over-production caused by the erection of new factories and increasing the capacity of older works. At times sales have been made at less than the cost of manufacture. How long the present compact will last cannot be conjectured, as the idea has long been discussed in the trade.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the columns of the ENGINEERING AND MINING JOURNAL.

PYRITE SMELTING.

The Editor:

Sir.—In reading the various articles on matte smelting I notice that though hot blast is generally conceded to increase the capacity and to give cleaner slags and better conditions in general, the stoves are of low efficiency and troublesome to keep in repair. As the furnace gases cannot be used for fuel, brick stoves seem not to have been tried at all, as they need a gaseous fuel. It appears, however, that for conditions like southern Arizona, where petroleum is used to heat boilers instead of coal, petroleum might just as easily be used to heat a brick stove, and all the trouble coming from cast-iron stoves would disappear, and a plant might in this way largely increase its capacity and decrease its fuel consumption. From what I have observed at smelters in southern Arizona, success in running a furnace with a top fire depends almost entirely on judgment in feeding the furnace. I have seen at one plant how the blow-holes, that always form with high-pressure blast, are fed with slag by hand, with the intention of keeping the furnace open, and the result is that by feeding an easily-fusible material into that part of the furnace which is open, the rest is chilled and the furnace is always in a bad condition and full of crusts. Also, at the same plant, the weight of the charges, ore and coke, has been decreased, with the result that the coke does not get a sufficiently thick cover to keep it from burning out before it reaches the fusion zone. As the plant is new and the method of charging is directly from cars which dump sideways into the furnace, this arrangement has been blamed for the unsatisfactory running. At a neighboring plant, however, though the material is brought up in big two-wheel barrows by hand, the dumping into the furnace is exactly the same, almost no hand-shoveling being done. Only the charges are larger, and special care is taken to cover the coke up immediately with a large amount of ore, and to put ore and not slag on top of the blow-holes, while the slag is put to those places which show the least heat, and the furnace keeps in good condition all over.

AMADO BUEN.

Douglas, Arizona, May 21, 1904.

THE BARABOO IRON ORE.

The Editor:

Sir.—While reading the short review of Mr. Leith's *Bulletin* 225 in the JOURNAL of April 28, in which mention was made of Mr. Weidman's report on the iron ore deposits in the Baraboo district in Wisconsin, it occurred to me that I had some years ago observed the same dolomite formation, and at that time I believed it to be of the same age as the dolomite which occurs farther to the northwest, and especially that in St. Croix and Dunn counties.

At the time of my visit, no iron ore had yet been discovered around Baraboo, but I had found manganiferous limonite in the counties above named, occurring in spaces produced by dissolution of the lime rock. Now if the age of the latter be the same as that of the Baraboo dolomite, it follows that the last named—the Baraboo dolomite—is not of pre-Cambrian age, but Upper Silurian, and also that the iron deposits found therein are not of contemporaneous occurrence, but later, and have been produced in a manner similar to those that I found in Dunn and St. Croix counties. These are the products of thermal waters which began by dissolving the lime, leaving their mineral contents in the form of marcasite; later on this mineral was changed through the influx of meteoric water containing free oxygen and perhaps humic acid. Very frequently I found beautiful pseudomorphs, well-shaped and preserved crystals of limonite, which had retained the crystalline form of the original mineral, marcasite.

As I pointed out above, this iron pyrite contained also a considerable quantity of manganese, which had in part separated from, and in part was retained by, the iron. Further, there was an appreciable amount of gold scattered through the ore. I said above, that, if the Baraboo dolomite is of the same age as that in the more westerly localities, it follows that it must be of a much younger formation than pre-Cambrian. My operations with the diamond drill in St. Croix county yielded indisputable proof that the dolomite in that region is of Upper Silurian age. I drilled 500 ft. below that rock, striking a rather soft sandstone, which consisted of the decomposition products of a formation that contained native copper in fine scales, and evidently some gold also. The most interesting discovery, however, was that of large and massive beds of little shells of the genus *avicula socialis*, changed into pyrite through the influx of iron sulphide solutions. Most interesting would it be to ascertain whether this fossil is not also to be found in the Baraboo district; should this be the case, then, perforce, the classification of this dolomite among the pre-Cambrian rocks must be erroneous, because nobody will contend that even the lowest form of animal life was in existence at that period.

F. HILLE.

Port Arthur, Ont., May 24, 1904.

AMORTIZATION.

The Editor:

Sir.—The subject of 'Mine Equipment and Ore Reserves' has been so well treated by experts in the JOURNAL, that I hardly feel competent to join in the discussion from the scientific side. I would like, however, to say a few words on the question of amortization, which hardly seems to be understood by some of your correspondents. I feel further disposed to do so, as some of my friends have asked for a little instruction on this point. The word amortization is French but it is a good one to take over into English speech, as we have no single word which expresses the idea. Sinking fund does not cover it, for that is applied only to some special provision for the payment of bonded debt or debentures. As nearly as I can express it, amortization is the provision from earnings of a fund, independent of dividends, which will, in a given period, repay the original investment. To provide such a fund is not usual in this country, though it is frequently done in Europe; and in France, at least, it is required by the law governing the operations of incorporated companies.

A mining investment, in the great majority of cases, is a terminable investment, not a permanent one. That is, it will end and become unproductive after a time, shorter or longer, according to the nature of the mine. It is not a permanent investment, like a railroad, which may be expected to last and to return profits for an indefinite period. A mining investment, therefore, to be good, should return not only ordinary interest on the capital, but a further sum, sufficient to repay the original capital during the life of the mine. A railroad, for instance, with proper allowance for repairs and renewals, will probably be earning profits and be worth at least as much as now twenty or forty years hence, and its owners will still have the security. But twenty or forty years from now the owners of a mine now profitable may have nothing but some extensive excavations and a lot of machinery, which is likely, at the best, to be worth only its selling value as scrap. So with all mining investments; they run with the life of the mine, and the return should be large enough to equal the capital, plus interest, during that life, whatever it may be.

In France, the usual custom, I believe, is to divide the amortization fund among the stockholders when the company has to go out of business. In Germany, very little amortization is done, for the German custom is to nurse a mine and carry it along forever, by taking as little out of it as possible each year. The exception is found in a few of the big coal companies, and they have amortization funds, which are usually applied to the purchase of more coal lands. In England they do not say amortization, for your Englishman has a strong propensity to call things by names that mean something else. But they have depreciation funds, surplus funds and what-not, which amount to the same thing. There are various ways of using these funds. That most approved seems to be the purchase of new property, so that the company may be kept alive. Occasionally the funds, whatever they may be called, are returned to stockholders; this is often done by buying in, or paying off, part of the stock from time to time, so that the capital stock is reduced gradually, as the mine decreases in value. The continuance of the company, with a new property, seems the favorite method, however. The Englishman is cosmopolitan in his investments, and there are, sometimes, curious changes. Thus, some years ago, a company which had been mining in Idaho, gave up its exhausted property and bought a mine in Western Australia, still retaining its old name. Such instances might be multiplied.

Except in France, there seems to be no uniform rule as to the manner in which payments are made to amortization funds. The fairest and most uniform method seems to be a fixed charge on ore mined, based either on quantity or on value, according to the nature of the mine.

In this country amortization funds are not usual. The general practice is to pay out surplus in dividends, leaving each stockholder to make his own amortization, if he is disposed to do so—usually he is not. This is based on the continual shifting of stock ownership. With few exceptions the American investor does not buy mining stocks to keep. He sells them when he has a chance to make something. It has been said that the ownership in an American mining company changes, on an average, every five years; and, quite probably,

this is not far from the truth. Under these circumstances, it is quite natural that a stockholder should prefer to get all that he can out of his shares while he holds them, without looking to the future.

An exception is found in some coal and iron companies. Thus the Delaware & Hudson Company includes in its expenses a fixed sum per ton of coal mined, which goes into a fund which has been, up to date, used to pay off the company's mortgage bonds. These are now nearly all retired. The Reading Company has done the same thing since its last reorganization. The Pittsburg Coal Company has a similar charge on earnings, the sum thus set aside being used chiefly to buy new coal lands. In the last-named case the amount has been calculated on such a basis that the fund will replace the coal lands mined out each year, and so keep the company going as long as there are new lands to be bought.

Among iron companies several of the larger southern companies also make a charge to earnings based on the iron ore and coal mined each year. The Sloss-Sheffield Company makes, in addition, a charge of 25 cents for each ton of pig iron made, the fund being used to renew its plant. The Oliver Iron Company, which is the iron mining branch of the United States Steel Corporation, has a system of charges based on ore mined.

In none of these cases, however, except the Delaware & Hudson, are these funds applied to reduction of capital, and they are not, therefore, properly amortization funds. The iron mining companies referred to also own manufacturing plants, and it is essential to their operation that the supply of ore, or raw material, should be kept up. The retirement, or repayment, of capital is not considered in the matter.

On the whole, I do not think that American buyers of mining stock will take kindly to amortization funds, under present conditions. They prefer to trust to themselves, and to the chance of selling their stock, to allowing the company to look after the repayment of their capital at some indefinite future date. As long as this feeling lasts the practice of amortization can hardly extend.

Some day, we may take time to think a little about it, and then I believe the justice and reason of the plan will be realized. And it may do something also to promote permanence and stability in mine ownership—which is a thing much to be desired. INVESTOR.

New York, May 10, 1904.

TECHNICAL EDUCATION.

The Editor:

Sir.—The discussion brought out by Mr. Henry C. Jenkins' paper, 'The Equipment of Laboratories;' in a paper by Mr. John B. F. Herreshoff on 'The Training of Technical Chemists;' and the address by Dr. A. R. Ledoux on 'The American Mining Engineer' are evidence of the interest aroused in engineering circles on the subject of technical education; it is the revolt of the man of advanced practical experience against the pedagogue.

On an average, the graduating student begins his professional career at 22; is it not a little unfair to place all the responsibility for a product taking that length of time to mature on the institution having him under supervision and training during but four of the 22 years? One realizes the inevitableness of this responsibility under the present system of school education, but is it not possible rather to prepare a better quality of raw material by some system of separation prior to the college curriculum; as, for instance, a preferentially selective sifting—an engineering clearing house?

The recent magazine articles giving the life history of "captains of industry" have unanimously agreed that nearly every individual was driven by necessity into the paths of his opportunity, and thereafter his most typical qualification was initiative—mentally directed energy. Those who succeeded lived in, as well as by, their work; their mental and bodily energies were focussed on one point at a time. In most instances this mental concentration began before the age of 16 years.

The training of the kindergarten receives many sneers undeservedly. It is essentially a training of the processes of thought by means of the five senses; if you like, the withdrawal of the animal and the induction of mental instinct. The child often leaves the kindergarten only to unlearn the method of self-education brought to bear upon him by force of example and the influence of environment; then begin ten years essentially of driving in, with but little drawing out, and later four to six years more of collegiate training, the which is valuable according to the system utilized and the individual receptiveness. To expect the boy of 16 to 18 to make a wise choice of a profession, with the usual heterogeneous education, is somewhat anomalous, and therefore the major portion of each college freshman year is devoted to a weeding out process, leaving but three years available for both general and special education. And this weeding out process is too often conducted by tutors possessing little knowledge or apprehension of human nature.

The methods now in use to further this elimination of the unworthy by means of additional entrance examinations can scarcely accomplish their object. To be letter-perfect in memory is not a prime necessity for professions requiring industry and observation. Remembrance of the sources whence the desired information may be procured and practice in the utilization of such matter is apt to be the sum of one's collegiate education. The letter-perfect man too often is helpless in face of a slight change of occupation or problem.

Thus the raw material of our engineering supply is very imperfect both as to education and intentness of purpose. The elimination of the arts and humanities from the pre-collegiate course has scarcely tended to the purification of our embryonic engineering material. The trade schools have failed as a stop-gap for this condition of affairs, mainly because would-be teachers have practiced their prentice hands at the expense of trade school utility, and also because these schools have lacked both means and breadth of vision.

By all means improve the technical curriculum to the highest point of efficiency, but unless like improvement be made all along the educational line of battle, a year or two of selection by the education of the hands in a trade school of proper scope will become a positive necessity; and I believe that such pre-collegiate selection could be initiated easily and utilized advantageously at the present moment. There is surely no insuperable difficulty in the simplification of the underlyng scientific and technical principles to the comprehension and tentative manual education of the boy of 16 to 18 years of age!

On the very great individual advantage of reasonable manual dexterity to the graduate of any profession, it is unnecessary to dilate. It is my opinion that the advantage to the world at large will be incalculable, for such dexterity, accompanied by mental concentration, has been proved to develop confidence, independence, initiative, industry and acquisitiveness.

While our Herreshoffs, Edisons and Carnegies will still continue to burst forth full panoplied from the cradle, it is not impossible to turn out equally efficient products from properly prepared raw material of even less promise.

H. A. MATHER.

New York, May 25, 1904.

ELECTROLYTIC TREATMENT OF ZINC SULPHIDES.

The Editor:

Sir.—A recent article in your esteemed JOURNAL has drawn a contrast between two methods of treating mixed zinc sulphide ores by electrolysis. In regard to the results obtained by the use of fused chlorides, so ably championed by Messrs. Swinburne, Ashcroft and others, no criticism is here offered; but, as some of the statements as to the results obtained in the wet way differ from those obtained in some recent work, a description of the latter may be of interest.

Various ores were treated by an alkaline solution, which was then electrolized and the lead plated out completely, after which, in another set of cells, the most of the zinc was plated out and the solution returned upon fresh ore, where it was again enriched by lead and zinc dissolved from the fresh ore; care being taken that a large enough amount of solution was used so that all the zinc and lead in the ore could go into the solution without saturating it. The voltage used in the lead cells varied from 1.5 volts to 1.7 to 1.8 volts per cell, depending upon the degree of concentration of the solution, also upon the percentage of lead in solution and number of amperes per square foot of cathode surface—chiefly, although some other factors may, and frequently do, cause some slight variations—the first cells always show the lowest voltage. A fair general average of the voltage in the lead cells would be 1.6 volts per cell, using 130 to 140 ampere hours to deposit a pound of lead. In the zinc cells the voltage may be made to vary within very wide limits; good work may be done from 2.25 to 5.6, or even 7 volts per cell, using a varying amperage of from 8 to even 200 amperes per square foot of cathode surface. With properly constructed cathodes 400 to 425 ampere hours sufficed to produce a pound of zinc. As 375 ampere hours are what theory calls for, the commercial efficiency falls between 88 to 93 per cent effective amperage.

While variations in the strength of solution, per cent of zinc carried and position of the cell in the series do cause differences of voltage, the number of amperes used per square foot of cathode surface is the great controlling factor; any increase in the number of amperes used increases the voltage. Equally good work can be obtained by using 2.2 volts up to 6 volts per cell, so far as the quality of the metal is concerned; it is deposited, hard, smooth and dense and of high tensile strength at any voltage within these limits. It is purely a commercial question whether to use 2.25 volts and 8 or 10 amperes per square foot or 3 to 3.5 volts and about 30 amperes per square foot, or even a higher amperage per square foot of cathode surface.

A higher efficiency requires a relatively larger plant per pound of zinc produced than a lower. Sometimes it is good policy to force the cells to do double the work and produce double the number of pounds of zinc per day, even if it does cost a little more current for each pound of zinc produced. As equally good results have been obtained from ores varying from 12 to 59 per cent of zinc and 4 to 20 per cent lead, the value of the metals left in the tailings will frequently control the easily regulated efficiency of the zinc plant. As with high values, in, for example, gold, silver and copper, and with plenty of smelter capacity and also of ore, it might be true economy to use a high voltage and get off the greatest tonnage possible.

This is hardly the place to go into a very extended discussion in regard to vitiation of the solution; it may perhaps be sufficient at present to say that after several continuous runs, some five or six months long, the solution, although several different ores were treated, some containing arsenic and manganese, was not vitiated.

C. A. BURLEIGH.

South Berwick, Me., May 23, 1904.

BATTERY FOUNDATIONS.

The Editor:

Sir.—In your issue of March 10 you give an interesting article on a decidedly novel type of battery design under 'Notes on a Cantilever Battery Frame,' by Mr. Ira C. Boss. There are one or two remarks in connection with the building of the concrete foundation that engaged my attention. In the first place, it would appear from the description given that, although the efficient mixing of concrete is advocated, yet apparently the wet batter of cement and sand was added to the broken stone *in situ*. If this is a correct reading, it would not appear an advisable departure from the usual practice. Again, it does not appear to me that the 'grouting in' of the mortar, after the concrete-block has set, is an advisable method; this quite customary method in machinery-setting has, in the case of mortar-setting, been fruitful of trouble, as may be learnt from the setting of mortars and anvil-blocks on concrete at the Alaska Treadwell mines and elsewhere. A more approved method is that given in a previous number of your JOURNAL, where the writer advocated the substitution of a wooden block, an exact duplicate of the mortar, being accurately set on the yet pliable surface of the rammed concrete with an added surface made of a stiff mixture of sand and cement, the block being screwed down and leveled accurately in position and afterward removed.

With regard to that very prevalent practice of inserting a piece of ¼-in. sheet rubber; I cannot say that I at all see the necessity of this or any other material being inserted between the mortar and its block. It was all very well, in the days that I can well remember, when mortars were supplied rough from the casting. But now, when they are accurately surfaced, and the mortar-block is also a plane surface, it would appear to me that the very object of the concrete foundation—an absolutely rigid base—is to some extent discounted by the resilience of the rubber sheet. As a matter of fact, I should imagine after some time that the actual 'cushion' disappeared, which was the case with the older form of tarred blanket.

It would appear to me that an absolutely rigid connection between the plane surfaces of the mortar bottom and the block would be more correct in theory, and would yield better results in practice, than this present-day relic of 'spring-beams' and 'tarred blankets,' the latter being necessary in the times referred to, when uneven surfaces were presented to each other. It would be interesting to ascertain through your columns what results have attended the discarding of any filling or joining material, such as described.

Support is given in this article to another very popular delusion, namely, the mixing of a certain amount of lime with cement, or *vice versa*. This is usually advocated for purposes of economizing the cement, but your writer would appear to be under the impression that this addition was beneficial to the cement. Seeing that cements are so carefully compounded, and that 'overliming' is carefully guarded against, if this very indefinite statement regarding the strengthening of the concrete by the addition of a small amount of lime can be substantiated by the results of actual tests, it would appear that the cement used must have been of an inferior order, and that its composition was defective; since, if it were possible to augment its strengthening properties in setting, in which the time factor is also important, one would imagine that this should have been the careful consideration of the chemist at the manufacturer's works, and not have been left to be discovered in actual construction.

With the remainder of the article I have no criticism forthcoming. The particular details referred to struck my attention, as at present I am engaged in putting in some extensive concrete battery foundations in Nicaragua, Central America, and I thought I would just jot down a few thoughts arising from a perusal of the above article.

H. E. WEST.

Matagalpa, Nicaragua, April 24, 1904.

THE TEXAS MINERAL SURVEY: FIELD WORK FOR 1904.

BY WILLIAM B. PHILLIPS.*

Owing to the assistance which has been given to the Texas World's Fair Commission, in the collecting and installing of the mineral exhibit at St. Louis, the field parties have been somewhat delayed this season. Two parties are now ready to leave Austin and work will be continued until December. The first party, with Mr. Arthur Stiles in charge, will have charge of the topographic mapping of the Van Horn quadrangle, El Paso county, under a plan of co-operation with the United States Geological Survey. The area embraces about 1,000 square miles and includes the Sierra Diablo. This region includes the old Hazel mine, which produced nearly $800,000 worth of silver-bearing copper ore a few years ago. Active prospecting is now being carried on in the district and excellent ores have been sent in to the laboratory of the Survey. Mr. Geo. B. Richardson, of the United States Geological Survey, traversed the region last year for the Texas Survey with the purpose of determining whether or no it would be feasible to secure good water within pumping distance of the surface. His report is to be published this summer. A more detailed examination of the region will be made after the topographic map has been prepared.

*Director of the Texas Mineral Survey.

Upon the completion of this work, Mr. Stiles will undertake a topographic survey of the Beaumont sheet, to include the Beaumont, Sour Lake, Saratoga and Batson's Prairie oil-fields. No topographic survey of any of the Texas oil-fields has yet been undertaken, either by the United States Geological Survey or by the State survey. Under the plan of co-operation which maintains between the National and the State Surveys, it is proposed to map all of the Texas oil-fields, running the contour lines within 10 ft. so as to allow of a closer geological study.

While speaking of the topographic work in the State, it is well to mention that the Chisos mountain sheet, Brewster county, will be ready for distribution in about two months. This sheet embraces the region east of the Terlingua sheet and shows the continuation of the quicksilver deposits to the southeast of the Chisos, the discovery having been made last summer (see this JOURNAL January 28, 1904). Recent advices from the quicksilver districts are to the effect that new discoveries have been made still farther east than any of the known deposits at and near Terlingua. The excellent display of quicksilver and quicksilver ores from Brewster county, Texas, in the Mines Building, St. Louis, is attracting a great deal of attention. In addition to a case of splendid ore samples, with assays attached, the exhibit contains a large iron pot holding 1,200 lbs. of quicksilver, with a 20-lb. cannon ball floating on the surface. It is the center of an eager crowd all day, for there are many people who have to be shown the ball floating on the metal before they will believe it.

The second field party of the Texas Survey will go out from Marfa, Presidio county. It will consist of Professor Udden, of the Iowa Survey, who prepared the report on the Shafter's silver mine district, Presidio county (now in press), and Dr. Phillips. This party will examine the black and white marble deposits in Brewster county, south of Paisano pass, and the silver-lead deposits east of Alpine. Camp will then be moved into the Christmas mountain coal-fields, Brewster county, and a detailed examination of this district will be made. It lies within reach of the quicksilver furnaces at Terlingua and could be drawn upon as a source of fuel for them. But the main work of this party will be a study of the region east and southeast of the Chisos mountains with reference to the extension of the quicksilver fields. There is no more interesting country in Texas than the area covered by these mountains and their foot-hills. They control the mineral possibilities of a large area, from the older quicksilver district around Terlingua to the newer discoveries 50 miles to the southeast.

A COAL MINE AMBULANCE.—The Lambton Colliery Company, in Durham, Eng., is building an ambulance room at the New Herrington colliery, for the benefit of any men who may meet with accidents in or about the mines.

ZINC CEILINGS.—According to the *Metal Industry*, stamped sheet zinc is rapidly coming into use for metal ceilings in places where steel has heretofore been used. In Germany the material is even copper plated and given beautiful finishes. Those who have had experience with rusting of steel will readily appreciate the advantage of using zinc.

ARTHUR L. COLLINS.

Among the current pamphlets issued by the American Institute of Mining Engineers is a biographical notice of the late Arthur L. Collins by his friend, Mr. Benjamin B. Lawrence. Collins was known to a large number of our readers; he was recognized as a man of brilliant promise and high character. Therefore, his assassination at Telluride, in November, 1902, sent a shock through the whole of the profession of which he was an honored member. For these reasons, we reproduce a part of Mr. Lawrence's memoir and add a portrait of his friend.

Arthur Launcelot Collins was born at Truro in Cornwall, England, July 8, 1868. His father, Mr. J. H. Collins, is well known as an engineer, and his books are widely read in this country. Arthur was the third son. Three of his brothers are engaged, as is his father, in the profession of mining engineering.

His education, gained partly at St. Austell, partly at Falmouth, and partly at Nuttall's Collegiate School at Truro, in Cornwall, was supervised by his father, who was then lecturer on the Mining Sciences to the Miners' Association of Cornwall and Devon.

In 1881, Mr. J. H. Collins went to Rio Tinto, in Spain, as chief chemist and metallurgist, and it was there that Arthur began his practical work in the laboratory and continued his studies in chemistry and mineralogy. To the latter science he was deeply attached; and he never lost an opportunity of adding to his cabinet of minerals, of which he was an ardent collector.

In 1883, he became assayer and general assistant to Mr. Nichols, manager of the Teña del Hierro copper-mines, near Rio Tinto. Until 1885 he was associated with his father in the study of the geology of the Rio Tinto belt. In 1885 he returned to Cornwall to take charge of tin-smelting works near Breage; and in the same year he accompanied his father on a mining reconnoissance in Lower Burmah, India. Upon his return he was engaged in mining operations in both Spain and Cornwall. In 1886 he accepted the charge of the important Berkeland zinc mines, near Stavanger, in Norway. It was here that he erected his first concentrating mill.

In 1890 Mr. Collins visited New South Wales, Queensland, Tasmania and other British Australasian colonies, examining deposits of gold, silver, lead, tin, quicksilver and opal. In later years, he often acknowledged the valuable experiences gained during this journey.

Early in 1892 he was engaged by the late Abdurrahman, Ameer of Afghanistan, as consulting geologist and engineer. This engagement, which lasted about eighteen months, was full of interest and excitement. The time was about equally divided between Kabul, the capital, Pughman, the Ameer's summer residence, and field-explorations in remote parts of the Hindu Kush. His most interesting and important professional work was the development of the Ameer's mines of *lapis lazuli*, which proved commercially valuable. During his attendance upon the court, his chief amusement (more or less obligatory) was playing chess with the Ameer, whom he soon learned it was not safe to checkmate, since defeat by "a dog of a Christian" was contrary to that potentate's conception of his own dignity and sovereign prerogative! During this period, Mr. Collins became pretty intimately acquainted with the Ameer and his sons, and with the interior workings of a despotic Oriental court.

In 1895 he became manager of the California mine and the Hidden Treasure mill, at Central City, Colo. The old California shaft, 2,200 ft. deep, was repaired, and the mine was thoroughly equipped under his skilful direction. In the mill, he introduced valuable improvements in the handling of tailings, such as the screen-frame attachment to the Gilpin county 'bumping-table' and many other devices for the increased saving of gold, so that, under his management, the Hidden Treasure mill paid substantial dividends, and is still regarded as the most satisfactory of all the mills in Central City which depend upon custom-work. This is but one instance of the way in which wide experience and the capacity for intelligent and exhaustive experiment placed him in the front rank as a practical expert. His mechanical genius was of the first order, as was shown in

ARTHUR L. COLLINS.

his new design for the construction of the frame of a stamp-mill, and afterwards in the construction of the mills of the Smuggler-Union mine at Telluride.

The closing years of his life were signalized by a struggle with the Telluride miners' union, then dominated by an anarchistic spirit, which terrorized the whole district. His courage and devotion under these conditions gained for him the support and friendship of the best citizens throughout the State of Colorado; but they made him a marked man for the revenge of cowardly antagonists. His life was continually threatened, but he persistently refused to leave his post or surrender to the forces of disorder. Finally, on November 19, 1902, while at home with friends in the Smuggler-Union office, he was shot by an unknown assassin; and 28 hours afterward he expired.

IRON-MAKING IN INDO-CHINA.—According to reports published in foreign journals there is a prospect that blast furnaces may soon be erected in Tonkin, French Indo-China. The material conditions seem to be favorable for establishing this industry, as iron ore deposits occur near Hanoi and coal is being produced at Hongay, which, being a seaport, would give access to the principal markets of the Far East.

A WESTERN SOCIETY FOR CHEMISTS, ASSAYERS AND METALLURGISTS.

At a recent meeting held in Denver, Colo., which was the outcome of conferences among chemists and assayers in Denver and elsewhere, the following resolutions were passed:

"In view of a growing sentiment among Western chemists, assayers and metallurgists favoring organization for mutual improvement and progress, and in consideration of the fact that such sentiment has been given substantial expression by a considerable number of men who have been approached on the subject; therefore, be it

"*Resolved*, That it is the sense of the undersigned that there should be formed an association of technical chemists, assayers and metallurgists, embodying those men interested in the afore-mentioned professions throughout the United States lying west of the Mississippi river and in the republic of Mexico and in British Columbia; and be it further

"*Resolved*, That a committee be appointed by the chairman of this meeting to submit the project to all available men throughout the above-mentioned districts; to invite their membership and co-operation in the society; to gather information relative to subsequent affiliation with one of our national or international societies; to collect data relative to the prospective by-laws, and any other information which will be of assistance in organizing the society on the broadest and best lines; and be it further

"*Resolved*, That this committee shall report to this temporary organization not later than 60 days from date."

Those present at the meeting were: Charles H. Bryan, Oscar J. Frost, W. F. R. Mills, H. C. Parmelee, C. A. Rose, G. M. Vail, Denver, Colo.; C. D. Test, F. W. Traphagen, Golden, Colo. Those represented by letter were: Leonard Worcester, Cripple Creek, Colo.; F. M. Bishop, Salt Lake City; Howard E. Burton, Leadville, Colo.; Horace B. Holmes, Boulder, Colo.; Edmund B. Kirby, Rossland, B. C.; Richard B. McGinnis, Douglas, Ariz.; Hugh F. Watts, Boulder, Colo.; J. Q. A. King, Phoenix, Ariz.; Stephen Rickard, Denver, Colo.; H. H. Nicholson, Lincoln, Neb.; Leonard & Root, Denver, Colo.; Herman Fleck, Golden, Colo.; J. N McLeod, R. W. Marston, Salida, Colo.; W. S. Eberman, Sumpter, Oregon; P. M. Collins, Salida, Colo.; George B. Squire, Hughes & Critchett, Seamon Assay Company, El Paso, Texas.

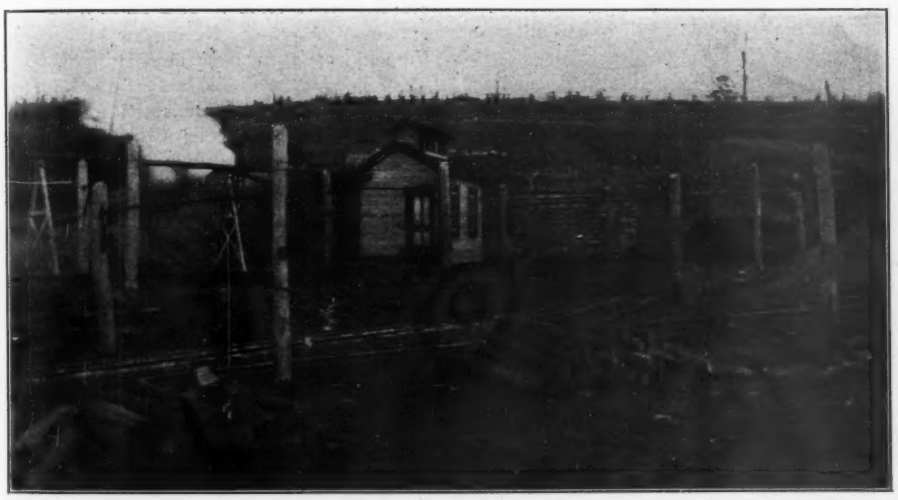
Mr. F. W. Traphagen was chosen temporary president and H. C. Parmelee temporary secretary. The committee on organization appointed consists of Messrs. H. C. Parmelee, Guy M. Vail and Chas. T. Test. The address of the temporary organization is Box 1421, Denver, Colo. The committee invites membership and co-operation in the proposed society, as it is desired to enroll as large a charter membership as possible. Correspondence is also invited, giving opinions on certain points before the committee. It has been suggested that it would be advantageous to affiliate the society with and form a section of either the American Chemical Society or the Society of Chemical Industry, a third course being to remain an independent organization.

No name has been selected for the new organization. The society will be formally incorporated, provided the committee receives responses from 100 men who are willing to become members.

THE EUREKA COLLIERIES.

EDITORIAL CORRESPONDENCE.

The Eureka collieries of the Berwind-White Coal Mining Company are situated in Somerset and Cambria counties, Pa., near the town of Windber, about 11 miles southeast of Johnstown, and near the village of Faustwell, some four miles west of Windber. They are excellent types of mines using electric haulage. There are 10 mines, numbered from 30 to 39 inclusive. The first mine, Eureka No. 30, was opened in 1897, and so rapid was the development that by 1902 the output of all the mines reached the great total of 3,133,000 tons. The lands being developed by the company comprise an extremely irregular area of about 60,000 acres. For the most part the mines are east of the axis of the Wilmore syncline, and the coal has a prevailing gentle dip to the southwest. The seam worked is the lower Kittanning, or B, of the Pennsylvania Survey, locally known as the Miller. It is 3 ft. 5 in. to 4 ft. thick on an average, but in places runs up to 5 ft. The coal is non-coking, but is an excellent steam fuel, and is largely used for bunker trade at New York harbor, fully four-fifths of the output of the mines going to tidewater.

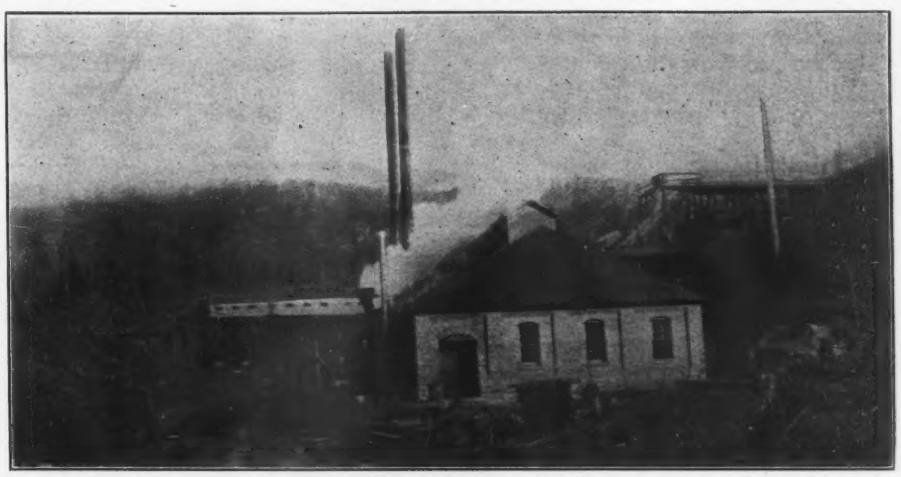


GENERAL VIEW, NO. 33 OPENING.

The Berwind-White Company, when it started work about Windber, spent a very large sum on equipment, and this equipment, with the extremely rapid development of the lands, has attracted much attention. As a result the mines have been visited by many colliery engineers from this country and abroad, and the equipment has been described or mentioned in papers read before engineering societies, or published in technical journals. Altogether the mines are probably the most widely known of any in the Clearfield region.

The present article does not attempt to cover in detail the many interesting features of mining practice to be seen at the Eureka mines, but briefly summarizes the present methods and equipment.

Stony creek and its tributaries, Big and Little Paint creeks, have deeply dissected an old peneplain of Cretaceous age, and mining can be carried on above water level over a wide territory. Eight of the mines are drift openings, with the coal lying level or dipping up to 5 per cent in favor of the load; the other two are slopes with grades from 1 to 4 per cent against the loads. The general plan of working adopted is that of room and pillar. The original plan was to have one main heading and two main airways on each side of it for each mine, with right and left side headings opening alternately from the main headings. Some of the mines opened, however, have two main headings and two airways, making four entries. There are no doors used in the mines, all airways crossing the side headings by overcasts. The main headings are driven 16 ft. wide and 5 ft. 6 in. above the rail, roof being taken down or bottom taken up to secure good grades. The main airways are driven in coal only, and wide enough to make 50 sq. ft. of sectional area.



POWER-HOUSE AT NO. 38.

The side headings for 90 ft. from the main heading are driven narrow, and then 16 to 18 ft. wide; of this width 8 or 10 ft. are used to gob the bottom or top taken from a width of 8 ft., so as to get 5 ft. over the rail. The distance from center to center of the main airways is 90 ft. The rooms are turned off 60 ft. from center to center, and, as a rule, are driven 30 to 35 ft. wide, since the roof is generally good, leaving a pillar of 20 to 25 feet. The rooms are driven 300 ft. long and a 30-ft. pillar is left betwen the face and next back entry. The management aims to keep the work of drawing pillars well up with that of driving chambers, that the roof may settle evenly and the percentage of coal extracted be large.

The company, in laying out plans for mine work, aims to drive headings on straight lines wide enough for the traffic to be handled. Great pains are taken to have the track carefully aligned, well ballasted, with curves of ample radius, the outer rails being raised on curves for a speed of 8 miles an hour.

Not a mule is used below ground. Electric locomotives collect the loaded cars, haul out the trip and distribute the empties at the room openings. The miners push the cars from the room openings to the breast, the rooms being laid off with a slight grade in favor of the load. In the main headings, two tracks of 40-lb. rail are laid 3 ft. gauge and 4 ft. apart, one as a loaded, the other as an empty track. There is a cross-over track to each side entry be-

CAPEL FAN AT NO. 38.

tween the two main heading tracks; side headings are laid with 30-lb. rail, and each room with 12-lb. rail. In the rooms, one track runs straight from the entry to the face, its center being 5 ft. from the rib. After the 30-ft. room-neck is turned, a track is turned off and runs along the other rib, making two tracks in each room. The gob is thrown in the center. All coal is cut by air punching machines of improved design, weighing about 700 lb. each. Sullivan, Harrison and Ingersoll-Sergeant machines have been tried. The cut made is about 18 in. high and 4.5 to 5 ft. deep, and two or three shots will usually bring down the whole face. A machine man and helper will cut across 4 to 6 rooms in 10 hours. Air is supplied to the machines by lines of 8-in. and 6-in. wrought-iron pipe, which are run along the main airways, with 2-in. and 4-in. pipe in the branch airways. Some of the pipe lines are two or three miles long, and their renewal, where the workings are wet, is a serious item.

The mine cars used are about 9 ft. long, from end to end of bumpers, and about 3 ft. high over the front end gate. They hold, on the average, 2,200 lb. and weigh about 1,150 lb. To handle the large output of some of the mines, 1,800 to 2,000 gross tons daily, it is necessary not only that the track should be kept in proper condition, with ample curves, good switches and moderate grades, but that the locomotives should have sufficient power. The locomotives used are of the Baldwin-Westinghouse and of General Electric make and weigh about 13 tons, having a draw-bar pull of nearly 5,000 lb. With a mine running at full capacity six locomotives are required; one at night, as heading work is carried on continuously, and five in the day. One locomotive usually takes care of 600 cars and can haul 25 to 40 cars to a trip, depending on the grades.

The 'oo' grooved trolley wire used is hung from the roof in the usual way, the heading contractors boring holes in the roof for the hangers. A wire-man puts up the line and is protected by a sectional insulator, so the locomotive can work close to the face. Sectional insulators are placed at about every 2,000 ft. on main headings, and about 20 ft. from the main headings on all side headings. By this arrangement each side entry can be cut out, in case of a short circuit, and the main heading quickly cleared for traffic. The locomotives take current at 500 volts, and no special provision is made to keep either men or mules from coming in contact with the naked wire, which is hung about 12 in. from the rib. To prevent delays and facilitate work, each mine is divided into sections, with a motorman for each section.

The surface plants for the mines are on the unit system, the company aiming to have its equipment standardized. Stirling boilers of 200 h. p., Ingersoll-Sergeant straight-line compressors and Thompson-Ryan direct current 200 kw. generators, direct-connected to McEwen 18 by 18 in. engines are used. This standardizing of units makes it easy to transfer power from one plant to another, in case of breakdown, and decreases the cost of repairs and supplies. The number of boilers varies at the different power houses, as does the number of electrical units, some power houses containing no electric machinery at all and others furnishing electricity for two or more openings. The mine fans are all of the Capell type, and are driven by Chambersburg engines. Some of these fans are single inlet, some are double inlet, and their proportions vary according to the water-gauge expected when the mine is well developed. The largest fans are 16 by 6 ft. All drift openings and the airways to the fans are of masonry. The fans all blow air, though one at Mine No. 30 may be used as an exhaust fan.

At each mine there is a shed for the electric locomotives, and at Mine 33 the company has a large brick supply and repair house provided with lathes, punches, shears, etc., for doing all ordinary repair work. The company has an exact system of keeping account of all supplies furnished each mine, and since the equipment is standardized, it is easy to determine whether repairs and renewals at one mine are costing more than they should and to find out the reason. The company now has in operation at its Eureka mines 26 Stirling boilers, 19 air compressors, 17 generator sets, 126 air-driven mine pumps, 52 electric locomotives, and nine fans.

At Faustwell the company is opening mines 38 and 39 on the B vein, here somewhat broken, and has also opened the C' vein, about 85 ft. above the B. This opening, known as No. 39 upper, shows the C' to be 3 ft. 8 in. thick and of good quality. To operate these openings and to supply power to the back side of mine 30 and other openings near Windber, the company is now erecting a power-plant, differing somewhat from those at Windber. The boiler-houses and power-houses there are all frame structures and have a temporary look. The new power-plant will be in brick buildings. There will be in the boiler-house twelve 200-h. p. Stirling boilers in four sets of 600 h. p. each, to which the coal will be fed by Roney stokers. In the power-house, shown in the accompanying cut, there are now in place, or are being installed, two duplex Ingersoll-Sergeant compressors, each with a capacity of 3,000 cu. ft. of air per minute, and two General Electric alternating-current 300-kw. generators. The current will be stepped up to 6,600 volts, carried by lead-covered cables a longest distance of about three miles, and stepped down to the working mine pressure of 500-550 volts by a rotary transformer.

There has been some criticism by visiting engineers of the equipment at Windber, principally that electricity was not used more generally. At present it is used simply for haulage, air-power, as stated before, being used for cutting the coal and for pumping. It may be said, however, that tests of electric coal-cutters made from time to time have not been altogether satisfactory, chiefly because of numerous rolls in the bottom, which greatly handicap chain cutters. The use of Cameron pumps, driven by air, instead of triplex electric pumps, for draining hollows in the mine and taking all water from the two slope openings, is, no doubt, partly because the Cameron pump does not require skilled attention. Other points in the company's practice that are sometimes criticized may be similarly explained. The chief impression one gets from an inspection of the surface works in the mines is the manner in which equipment is standardized. This factor, too often neglected by companies operating a number of mines, is a most powerful aid in securing maximum output at minimum cost.

All tipples are of wood and are equipped with Phillips cross-over dumps. The cars are pushed on to the dump by hand, the grade favoring the load, and from the kick-back the empties run to side tracks, where they are made into trips and picked up by the locomotives.

PETROLEUM IN THE PHILIPPINES.

Mr. F. H. Oliphant reports to the United States Geological Survey that petroleum is known to exist in the Philippines. It is found in the islands of Luzon, Panay, Leyte, Gimeras, Guimaras, Negros, Mindanao and Cebu. There are some oil wells on the island of Luzon, and capitalists usually prospect among these before they go to other islands. On the island of Panay are deposits of oil located from 200 to 500 ft. below the surface. On the islands of Negros, Cebu and Mindanao oil strata are worked by native and foreign capitalists. The position of these islands would certainly indicate the probable existence of petroleum, as Borneo, on the southwest, and Formosa and Japan, on the north, contain productive areas that are extensively operated.

The best oil appears to be contained in a stratum consisting of rock, gravel and sand, nearly 20 ft. in thickness, lying about 400 ft. below the surface. This rock is in some places too hard to pierce with the native devices, but American drilling tools cut it readily. In other places the so-called rock is only soft sandstone.

The Spaniards used to procure illuminating oils from some of the oil wells of Luzon, Panay and Negros, but their drilling machinery, refining devices and modes of distribution were extremely defective. During the last 25 years Filipino capitalists have been working at the oil wells and, with the aid of the Japanese, have developed some wells that produce the best grades of oil. The Chinese also have taken a hand in the oil industry of the islands. Recently some American discharged soldiers have been working. Through them the industry has been extended, but lack of capital has hindered their work. American capitalists are now interested in developing the richest deposits of the country, and have arranged for the purchase of the necessary plants. At the present time there are several well-established and paying plants in the islands. One which is located at Isadro, near Manila, is obliged to run day and night and tax its machinery to full capacity in order to meet its orders. A number of minor oil refineries distributed throughout the islands are said to be doing a good business and making money. The Philippine oils are usually dark green in color. By refining, an average of 8 per cent benzine is produced from the crude petroleum and about 40 per cent illuminating oil. The remainder is gas oil and tar. From the latter paraffine is extracted. Labor at the wells is extremely cheap, ranging from 10 to 12c. a day. For this price both the native and Chinese laborers give a full day's work and provide their own lodging and sustenance.

PEAT BUILDING BLOCKS.—A recent report from United States Consul-General F. H. Mason, at Berlin, Germany, says that 'heloxyle' is the name given to peat fiber compressed and hardened by a special process into sheets, tiles, plates and blocks for various building purposes. It is used for lining walls, ceilings, window and door frames, to underlay wooden flooring, and even as flooring itself. It has about the consistency and atomic weight of sound cork, and, being a non-conductor of heat, moisture, sound and vibration, it is of value in locations where warmth, dryness and protection from noise or jar are especially desired in dwellings and other constructions. It is impregnated with some material which renders it practically incombustible.

ELECTRICITY OR STEAM FOR HOISTING.

In a paper read before the South Wales Institution of Mining Engineers, an abstract of which appears in the *Coal & Iron Trades Review*, Graham M. Stevenson says that the requirements of a good hoisting engine are:

1. Freedom from liability to break-down or failure to act through any cause.

2. It should be under complete control, and respond instantaneously to any movement of the operating-levers.

3. It should get quickly under way, perform the journey and be capable of being brought to rest in the shortest time compatible with safety.

4. The speed, when required, should be such as to admit of minute inspection of ropes, slides, etc.

5. Wear and tear should be reduced to the lowest possible limits, and renewal parts capable of being fitted during a stoppage of two or three hours at most.

6. The cost of running, including coal-bill, attendant's wages, supplies and renewals should be reduced the lowest possible amount.

7. First cost must be such that depreciation charges will not swallow up the savings effected by increased efficiency.

A well designed and properly constructed steam hoisting engine meets the first and second of these requirements about as well as anything which we are likely to see brought forward as a substitute. In the case of a pump, it is always possible to provide duplicate parts which can be put in before serious danger is likely to arise; but in the case of a winder it is not difficult to imagine circumstances in which a burnt-out coil in an armature may entail grave consequences.

In a steam engine for a large output the time taken to acquire the maximum velocity, and the energy wasted in again bringing it quickly to rest, are disadvantages inseparable from the heavy moving parts required to transmit the pressure from the pistons to the crank-shaft; while in the electrical hoisting-machine the only moving part is the rotor of the motor, which weighs very much less than the cranks, connecting-rods, cross-heads, pistons and piston-rods of a large engine. The drum may be left out of consideration in this connection because the advantages of reduced weight possessed by the Koepe drum apply to both systems.

Hoisting by an endless rope running in a single groove has not found many supporters in England, but it is not necessarily a feature of the electrical hoist.

The fourth requirement is one which presents no serious difficulties, and it cannot be said that either system under consideration possesses any superiority over the other.

Anyone can understand that when we want to produce mechanical energy for any purpose, then the more directly we apply it the better will be the results from the point of economy.

But the steam engine, when used for hoisting, is working under conditions which make it necessarily extravagant in steam consumption, when compared with an engine running at a uniform speed and under a comparatively steady load. Most engineers will agree that even the most modern steam hoisting engine leaves much to be desired in point of steam consumption. The fact that it is only getting properly under way when steam has to be shut off to allow it to come to rest prevents the attainment of any high degree of efficiency. On the other hand, a steam engine driving an electric generator can be run at nearly uniform speed.

A hoisting machine which is to be driven by power obtained initially from a steam engine must base its claims to consideration upon its ability to perform its functions without throwing seriously disturbing fluctuations of load upon the engine; for, if it is simply going to draw off a large supply of energy during the early part of each journey and take none at other times, the generating engine will be so large and its load so unsteady that its steam consumption will probably equal that of an ordinary steam hoist.

When the electrical hoist forms one of a number of such machines, say two or three, supplied with current from a central generating station, it will probably be found to raise more coal out of the pit per pound of steam used than a steam hoisting-engine of the ordinary kind; and when, in conjunction with a single hoist, a considerable amount of power is required for other purposes, equally good results may be expected.

There can be no doubt that the steam-hoist will not compare favorably with the electrical-hoist from a steam consumption point of view, where the latter can be worked in conjunction with a power transmission plant of relatively large proportions. The total cost of working the two systems, in the author's opinion, will not show such a decisive advantage in favor of the electrical-hoist.

The question of first cost is one which is not likely to be lost sight of by intending purchasers of either type of machine. It appears, from statements made by manufacturers, that for an output of 200 tons per hour the first cost of a compound steam-hoisting engine, with automatic cut-off gear and modern improvements, and that of an electrical-hoisting machine, like the one at Zollern II colliery in Germany, would come out at about the same figure. This is exclusive of generating plant, and the question is somewhat complicated by the fact that the Zollern II plant is not to be used solely for hoisting, but is to transmit power for pumping, hauling, coal-washing, screening, etc.

The danger of injury to insulation in a motor is greater than any risks which are involved in the working of a steam-hoist, and for that reason the use of two motors must be regarded as a distinct advantage. In a steam engine the parts requiring renewal or adjustment from time to time are the piston-rings, packings for piston-rods and valve-rods, connecting-rod brasses, steam-valves, exhaust-valves and other details which can usually be overhauled or replaced on a Sunday; and no electrical hoist for deep shafts will be entirely satisfactory unless ample provision is made for keeping it up to "concert-pitch" by such attentions as it can receive during the ordinary intervals in its working life.

IRON IN AUSTRALIA.—United States Consul-General John P. Bray reports, from Melbourne, that a bill has been introduced by Sir William Lyne in the Australian house of representatives to provide bounties for the encouragement of the iron and steel industries in Australia. Should this bill pass and become law, as it probably will in a modified form, the imports of iron and steel from the United States will be largely affected. It provides a bounty of $2.48 per ton on iron and 10 per cent on value of manufactured iron and steel.

PYRITE SMELTING. A REVIEW.—I.

By Edward D. Peters.

At the request of the Editor, I have undertaken to review and comment upon a series of papers on the subject of pyrite smelting which have appeared in the columns of the JOURNAL between October 10, 1903, and the present time.

Pyrite smelting is a process of very recent development, and its published literature is meager. A large proportion of the metallurgists best qualified to write authoritatively upon the subject are actively engaged in practising and developing it, and have no time to write treatises. Messrs. W. L. Austin, F. R. Carpenter, and Herbert Lang had previously given us much valuable information as to the results obtained in their own practice; but there were many other metallurgists doing highly original and successful work in this field, from whom it was deemed desirable to hear. The editor of this JOURNAL, therefore, sent out last autumn a series of ten questions to a considerable number of the metallurgists of the world who are, or have been, engaged in this branch of the art. The replies to these questions constitute a body of information on the subject of pyrite smelting that I believe to be unique in the metallurgy of copper, both for its comparative unanimity of opinion, and for the authority of the sources from which it comes.

It is the object of this review to present, in a concise and graphic form, the results and opinions reached by these authors; to draw general deductions from them, so far as seems justifiable; and, incidentally, to comment on and discuss such points in them as seem to invite further consideration. Ten of the replies answer all, or nearly all, of the questions categorically, and thus lend themselves to the construction of a table, where a bird's-eye view may be had of the opinion of each metallurgist on each separate question. It has been difficult to express in a few words an opinion that may, perhaps, have occupied an entire column in the original reply, and I must ask the indulgence of the authors.

The results of this tabulation are striking, and it is interesting to note how little difference of opinion there is in the replies. Indeed, where differences of opinion exist at all, it is nearly always due to the fact that some of the individual questions cover so much ground that they admit of a good deal of variation in the answer, without there being any actual conflict. It is simply that they have been answered from a different standpoint, and that each author tends, naturally, to base his reply upon the particular class of ore that he is working, and upon which much of his experience is based; for pyrite smelting, in its modern form, is of too recent origin to admit of a very wide or varied experience on the part of any one person.

Thus, as a typical instance where conditions compel two differing answers to the same question: Mr. G. F. Beardsley has for years been smelting the unusually heavy pyrite ores of the Mt. Lyell mine in Tasmania, using enormous furnaces, and a high blast-pressure, and, owing to the great preponderance of basic, ferruginous ores, has been compelled to produce a slag as high in iron and as low in silica as was compatible with the desired ratio of concentration. Consequently, his replies to certain of Mr. Rickard's questions must, necessarily, be widely different from Mr. S. E.

QUESTIONS.	L. S. AUSTIN.	G. F. BEARDSLEY.	S. E. BRETHERTON.	F. R. CARPENTER.	C. H. FULTON.
No. 1. *What types of ore are suited to the process?*	Sulphide ores of Fe and Cu in quantity sufficient to give required matte-fall. Siliceous precious-metal ores to form suitable slag. Oxidized ores of Fe and Cu.	Pure pyrite and pyrrhotite, pre-eminently, with sufficient SiO_2 and earthy bases to form a suitable slag. Physical condition of ore important.	Types of ore containing Au, Ag, Cu, and Pb, unless there is Pb enough present for lead smelting. Even ores tolerably rich in Pb, if containing As and Sb.	Any Au, Ag, or Cu ores not carrying Pb sufficient for lead smelting. SiO_2 or CaO must be added where needed to make a suitable slag.	Any ore mixture containing sufficient S to form suitable matte with Fe and Cu, and with sufficient SiO_2 to form a rather high siliceous slag.
No. 2. *Is hot blast advisable?*	Hot, or even warm, blast is a great aid. If properly installed, probably of great advantage in smelting siliceous or comparatively infusible charges.	Advisable, and in some cases necessary, especially with a siliceous slag. Hot-blast pipe stoves are a most wasteful apparatus for heating air.	Emphatically, yes, for the following reasons: 1. Increased capacity. 2. Saving of fuel. 3. Less trouble with tuyeres. 4. Better elimination of Zn and As.	Desirable, but not an absolute necessity.	Have not had sufficient experience with a *hot* blast to compute saving of fuel. It increases oxidizing effect and yields a richer matte.
No. 3. *To what extent can fuel be eliminated?*	With plenty of sulphide ores, coke has been cut to 6% and less. Rapid running needs less coke than a slow-running siliceous charge.	With heavy pyritous charge, proportion of coke to charge may vary from 0.3% to 3%, being dependent on manner in which the sulphides are distributed through the gangue. (See full elucidation of this point later. —E. D. P.)	Usually not advisable to reduce coke much below 4%, though have run for days on 3%. (I understand Mr. Bretherton's coke contains about 24% ash.—E. D. P.)	All carbonaceous fuel can be eliminated, and it is desirable, that it should be eliminated in ideal, or true, pyritic smelting.	Unanswered.
No. 4. *What amount of copper is required for the collection of the precious metals?*	A charge containing sulphide ores, free from Cu, will not yield a clean slag; but as little as ½% Cu will suffice if other conditions are favorable.	My own experience has been limited to a minimum amount of 1.5% Cu in the charge. This gave clean slags.	Depends on character of ore, especially where much Zn is present. I don't like to go below 1% Cu in the charge, and prefer 3%.	Depends somewhat on degree of concentration. Where very little matte is made, it should contain, perhaps, 10% Cu. (This might mean ½ to 1% Cu in charge.—E. D. P.) Cu may be entirely unnecessary, with both Au and Ag and fair mattefall.	At Rapid City, an iron matte alone failed to collect the Au and Ag with entire satisfaction. We now arrange to have the charge contain at least 10 lb. Cu for each oz. of Au present. Matte-fall = 4 to 5% of charge.
No. 5. *What percentage of lime is necessary to a clean slag?*	CaO is used as a base to supplement the FeO, rather than to cleanse the slag, though it is thought to have that effect. Clean slags are made as low as 5% CaO.	The copper matte—*not* the lime—is the slag-cleanser. Enough CaO, or other earthy bases, perhaps 13%, should be used to lower the specific gravity of the slag.	The "cleaning" effect of lime mainly due to its lowering specific gravity of slag, which is also equally well effected by other earthy bases.	Is used merely to lower specific gravity of the slag, and, in certain cases, to increase its fusibility.	Lime is necessary for the production of a slag out of which the globules of matte will settle rapidly, especially if the matte also has a low specific gravity.
No. 6. *What percentage of zinc in the charge can be treated profitably?*	Zn up to 10% of the charge has been successfully treated. In presence of much Al_2O_3, Zn makes continued trouble.	Unanswered.	In practice, I should put the maximum amount of ZnO in slag at 11%, and the FeO must be proportionately reduced. There should be a minimum of 10% of earthy bases.	Unanswered.	Unanswered.
No. 7. *What is the degree of desulphurization attainable?*	In raw sulphide smelting, where pyrite is used, at least 66% of the S is driven off.	In smelting heavy pyrite ores, the desulphurization would be 80 to 90% of the S present.	Unanswered.	Depends upon conditions. At the Deadwood (Au and Ag) smelter I have often oxidized *all* of the pyrite, making no matte. (See Dr. C.'s paper, Trans. A. I. M. E., Vol. xxx, p. 764.—E. D. P.)	At Rapid City, 75 to 80% of the S is removed in the smelting, and I think still higher desulphurization could be attained if desired.
No. 8. *What are the possibilities as to capacity of furnace?*	A siliceous charge, or one containing much Zn or Al_2O_3, runs slowly. A basic, fusible and coarse charge runs rapidly, for instance in the Boundary district, where 450 tons per 24 hours have been smelted.	On heavy pyritous ores, with 40 to 45 oz. blast, the 42 by 210 in. Mt. Lyell furnace has smelted a charge of 530 tons in 24 hours.	Depends on varying conditions. With hot blast, a furnace will smelt fully one-third more than with cold air.	Capacity of pyritic furnace not over half as great as on roasted ore. A 36 by 192-in.-furnace, producing a 40% SiO_2 slag from siliceous pyrite and limestone, averages 250 tons per 24 hours.	Much less than on roasted ore. A 38 by 144 in. furnace smelts 150 tons daily, there being considerable fines in the charge.
No. 9. *What are the limitations of the process?*	Depends on proper supply of sulphide ore, and available Cu in the charge, and on skill in running the furnace; it being much more difficult than smelting roasted ore.	Want of sulphides in the ore, and excessive amounts of Zn and Pb.	See reply to No. 1 question. (No. 1 question was answered very fully by Mr. Bretherton in his original letter.—E. D. P.)	Practically no limitations if the ores do not carry Pb.	See reply to No. 1 question.
No. 10. *What is the relative economy as compared with rival processes?*	Unanswered.	It has no rival where suitable. Great rapidity. From moment of feeding the ore into blast furnace to pouring converted pig copper into moulds is about 5½ hours.	Answered in my replies to the preceding questions.	It saves roasting. It saves fuel in smelting. It permits the production of highly siliceous slags.	A serious rival of other smelting processes, of water concentration, and even of chlorination and cyanidation, even for low-grade ores, on account of the high saving made.

QUESTIONS.	W. E. KOCH.	HERBERT LANG.	R. L. LLOYD.	E. P. MATHEWSON.	W. H. NUTTING.
No. 1. *What types of ore are suited to the process?*	All ores are suitable, so long as there is sufficient S and Fe.	Any Au, Ag, or Cu ores free from paying quantities of Pb, and that can be so mixed or fluxed as to form a proper slag and matte, and furnish heat.	Any ores whose values consist in Au, Ag, or Cu, and where sulphide ores can be advantageously obtained.	Any ore carrying S in the shape of pyrite, chalcopyrite, or pyrrhotite.	Iron sulphide ores—the purer the better—combined with silicious ores. ZnS objectionable. PbS does not interfere with the process, but loses the Pb.
No. 2. *Is hot blast advisable?*	In our work, a warm blast (200° C.) meant success; a cold blast, failure. No man who has not used a hot blast can appreciate its advantages.	My later experience is altogether favorable to the use of the hot blast. It saves fuel and increases capacity.	I should say emphatically, yes, for nearly every reason: Saving of coke. Increased capacity. Better desulphurization.	Advisable where it is desired to increase the grade of the matte produced in ores not too rich in sulphides. Also where coke is expensive.	Metallurgically advantageous, but might not be worth while where coke is cheap. Presence of ZnS and of fines would also affect decision.
No. 3. *To what extent can fuel be eliminated?*	We have found 5% coke the lowest practicable limit. We generally use 7% of the weight of the ore charged.	Varies with conditions. Hot blast may save ½ to ⅝ of the coke. Smelting heavy sulphides with cold blast usually means little coke and a low ratio of concentration.	Varies with conditions. With Butte ores, containing a considerable amount of coarse, raw sulphide concentrates, it is common to use a charge of 92% ores and fluxes, and 8% coke.	May be entirely omitted if sufficient pyrite is present. Probably 4% coke is as low as anyone has reached in the United States.	With a coarse charge and suitable pyritic ingredients, coke can be eliminated in proportion to the absence of fines and ZnS, down to the intermittent use of 2 or 3%.
No. 4. *What amount of copper is required for the collection of the precious metals?*	We make clean slags from a charge containing ½% Cu, ½ oz. Au and ¼ oz. Ag per ton. Ratio of concentration, 15 into 1. Matte contains 7 to 8% Cu.	A little matte high in Cu gives cleaner slags than a greater amount of matte low in Cu. To use an iron matte, very low in Cu, the slag should contain a considerable proportion of earthy bases.	A reasonably close gold collection can be made with a matte free from Cu. To make a matte high in Au and Ag, it might be necessary to have 1.5 to 2% Cu. in the charge.	Copper is not necessary for the collection of the precious metals. They will collect readily in an iron matte.	Charges containing considerable ZnS require 1 to 1.5% Cu to maintain sufficient difference in specific gravity between matte and slag. Otherwise, a fair collection can be made by an Fe matte alone.
No. 5. *What percentage of lime is necessary to a clean slag?*	Seven per cent. lime is enough with hot blast.	Perhaps the cleanest slag that could be made would be ½ bisilicate of CaO and ½ singulo silicate of FeO; but acceptable slags can be made with FeO as almost the sole base.	Dependent upon what other bases may be present. Can make tolerably clean slags with merely metallic bases.	Unanswered.	Amount of CaO necessary is governed by amount of available Fe for slag formation; this depending on amount of Fe carried into the matte.
No. 6. *What percentage of zinc in the charge can be treated profitably?*	ZnS is a very good fuel, but I do not know how much we could profitably use.	Unanswered.	A proportion of 10% ZnO in the slag is usually considered the maximum for fast driving.	Unanswered.	Difficulties begin at 3%, eventually blocking furnace at 12%. ZnS demands increased fuel, causes imperfect separation of matte and loss of Ag by volatilization.
No. 7. *What is the degree of desulphurization attainable?*	About 80% of the S in the charge is burned off, but I think we can do better.	Pyritous ores with a not very silicious slag may lose 60 to 70% S. With earthy bases and more SiO_2, 80% and more. Have burned off 96% from ore containing 11% S.	On Butte ores, with cold blast, 70 to 80% desulphurization is easily attainable.	75 to 80% on Butte ores.	60 to 70%, which would be increased by a more silicious slag, and slower smelting.
No. 8. *What are the possibilities as to capacity of furnace?*	Have not yet determined. I am averaging 50 tons per 24 hours in a 48-in. round furnace.	Unanswered.	Conditions vary. I consider 7 to 7½ tons smelted per sq. ft. of hearth area as reasonable work.	Capacity best regulated by ability to feed the furnace and handle the slag. We consider 600 tons per 24 hours the capacity of our 56 by 180-in. furnace.	Capacity largely modified by three factors: 1. Amount of flux required. 2. Per cent. of fines present. 3. Per cent. of ZnS present.
No. 9. *What are the limitations of the process?*	A lack of sulphur and iron.	If constituents of charge be rightly proportioned, there are no *metallurgical* limitations for ores of Au, Ag, or Cu.	Limited solely by economic considerations.	Too fine or too clayey ores. Also, as to whether it can effect a satisfactory ratio of concentration.	Competitive methods, or combination of methods, showing greater economy, governed to a great extent by fines, ZnS, and cost of coke.
No. 10. *What is the relative economy as compared with rival processes?*	No process can save practically all the Au, Ag, and Cu values in our ores so simply and so economically as hot blast pyritic smelting.	(Impossible to give a just abstract of Mr. Lang's full and thoughtful reply to this question. See his letter in E. & M. JOURNAL of Jan. 21, 1904.—E. D. P.)	Where conditions are suitable, it has no successful rival.	Where this process can be used at all, it is, practically, the cheapest known.	Less costly plant. No roasting. Rapidity. Silicious and clean slags. —E. D. P.

Bretherton's, who, at his smelter at Val Verde, Arizona, is almost always short of pyritous material; whose coke costs $13 per ton; whose profit arises almost entirely from the smelting-tariff on silicious gold and silver ores, containing more or less arsenic, antimony, lead, and zinc, all of which he has to completely remove in the pyritic fusion, so that his matte may not be penalized by the refiners for these substances; and who has no copper in his charge, excepting the little that he is forced to add to collect the precious metals, and which he has to bring by rail from a distance of some 500 miles.

Here are certainly conditions as diametrically opposed to each other as one can well imagine; yet a careful perusal of the two vertical columns of answers in the table, headed by the names of Beardsley and Bretherton, will show that these two highly experienced metallurgists have arrived at conclusions that are almost identically the same in nearly every respect. There are some points in each set of answers that are not touched upon in the other. But there is no common point on which the two differ materially. In no instance do their replies contradict each other; they merely supplement each other. This same unanimity of conclusions will be found to prevail pretty generally throughout the entire one hundred answers.

A similar agreement in experience and deductions will be found in the letters of Messrs. Ingalls, Weinberg, Godshall, Heywood, Read, and others, which form a part of this same discussion, and of which I shall equally avail myself in this review, although it was impossible for me to include them in the table without taking greater liberties with the text than would have been justifiable.

When a dozen or more practical and experienced metallurgists agree upon a technical point, we may feel safe in accepting it as a fact—at least, until it is modified by new evidence. In these replies, there *is* such an agreement to a very remarkable extent, and we have here the material for the construction of a more solid basis of information in regard to pyrite smelting than we have hitherto possessed, though many of the views enunciated in these letters have been foreshadowed, and, in some instances, distinctly stated from time to time in articles by Messrs. W. L. Austin, Carpenter, Lang, and others.

PROPOSED CHILEAN DUTIES ON COAL.—United States Consul R. E. Mansfield, writing from Valparaiso, February 11, 1904, says that at the recent sitting of the National Congress at Santiago two measures were introduced which, if enacted into laws, will have an unfavorable effect upon the importation of coal from the United States into Chile. The clauses of the bills relating to coal are as follows: "Six months after the promulgation of this law foreign coal shall not be used by the State. The navy shall only use foreign coal when engaged in warlike operations."

The second measure relating to the importation of coal contains the following: "From and after March 1, 1904, foreign coal shall pay a specific import duty of 1.50 pesos (53c.) per metric ton."

These measures failed of passage at the last session of the Congress, but it is understood that they will again be presented at the next sitting, and their passage urged in the interest of the coal operators of Chile.

ELECTRICITY IN WITWATERSRAND MINES.*

By S. F. Walker.

In South Africa, as elsewhere, electricity is making its way against the opposition of its great rival, compressed air. Steam, also, is being displaced by electricity. That is to say, the process which is going on everywhere else is going on in South Africa; steam is being used in generating electricity for distribution, or compressing air for the same purpose, and not being used for small engines, locomotives, etc. Up to the present, compressed air and electricity have practically divided the control of certain portions of the work, while other portions are gradually being delivered over to electricity. Thus pumping has been done almost entirely by electricity, while rock drills have been almost as entirely worked by compressed air.

Most electrical engineers who have assisted in the development of the use of electricity for power work have feared the use of electric motors where sudden strains are brought to bear on the motor, as when a hot steel billet is first placed between the rolls to be made into a steel rail. The power absorbed goes up from nothing, or only that due to the friction of the rolls themselves to several thousand horsepower, and as suddenly goes back to nothing. The same thing applies in a smaller degree to crushing machinery such as that in which a pair of jaws catch the stone between them, and break it up into small pieces. The difference in the strain upon the motors, when no stone is in the machine and when the jaws encounter the stone, is very serious. There is the same thing, in a smaller way, in a circular saw-mill, when a big piece of wet timber comes under the saw. But there is one rule for all these cases: make the motor well above its work, so that even the very heaviest load, the very heavy torque at starting, shall not be in excess of its possible load, and all will be well. With the stamp battery, however, there is none of this. The load is known at all times. There are so many stamps to lift each minute, such a distance, and the friction of the apparatus, and that is all. Any uncertainty in the results does not affect the work to be done on the stamp. There is, of course, the question of the economy of a stamp mill, but that does not affect the question of the use of electricity for driving them. In the Barberton district, for a long time before the war and since the war has finished, the whole of the appliances of a gold mine have been driven by electric motors, furnished with current from a supply station some miles away, deriving its energy from water power.

In the mine itself, the openings are for winding, for pumping, for haulage, for drilling and for ventilation. As already remarked, for pumping, electricity is the agent best recognized on the Rand. Apparently it has fully justified its choice. In the Knight's Deep mine, some motors and cables which had been used for pumping before the war were left, and are stated to have been under water for two and one-half years, and to have been taken out, dried and put to work again with satisfactory results. The name of the maker of the motors is not given. At this mine, also, 2,500,000 gal. of water were pumped out every 24 hours for five months. This means something like an expenditure of 10,000 h. p. on pumping alone for the period named at that mine. At the Robertson shaft of Knight's Deep mine three electrically driven high-lift three-throw pumps have been put down capable of delivering 400,000 gal. of water per day of 24 hours, against a head of 1,250 ft.

Drilling should offer a good opening for electricity. At present the drilling is almost entirely done by compressed air, except where it is done by hand. In coal mines very great attention is paid to the matter of ventilation because the air current is required to dilute the inflammable gases which are given off from the coal, as much as to provide fresh air for the miners to breathe. But in metalliferous mines, there is not this incentive. There is no gas to be feared. Also ventilation, with the system of working tin and gold mines, is not an easy matter. Under these circumstances the fresh air coming from the exhaust port of the compressed air drill is a godsend, though it is not much in actual quantity. As will be understood, also, the temperature at the depths at which 'stoping' is carried on is pretty high, and men who are working hard feel very kindly toward the apparatus which gives them a little cool air. There is a more important reason than all, however: the unsatisfactory nature of the electrically worked drills that have been put upon the market up to very recently. This matter of drilling by compressed air, or by electricity, is very closely connected with the very troublesome question, at the present time, in South Africa, of labor. Every manager in the district complains of the shortness of labor, and it is not white labor; that apparently is plentiful, though its quality seems to be sometimes a doubtful quantity. It is native labor that is wanted, because the native, working on the same lines as the early Cornish miners, with hand drill and hammer, can drill at a less cost than the machines can do, worked by the expensive white man, and fed with the equally, or more, expensive compressed air. The reason why the electric drill has not done much yet is that the problem is a very difficult one. There is no difficulty in producing a rotary drill, electrically driven. But for the great majority of work in connection with gold mines the rock to be drilled is very hard, and requires a percussion drill. Practically all electric percussion drills work on the system that some form of spring really strikes the blow, the electric motor winding the spring up. The effective working of the apparatus depends really upon the springs remaining good, and unfortunately every one knows how unreliable springs are apt to be under conditions such as would rule here. Nevertheless, whoever solves the problem of a good electrically driven percussion rock drill will render working very much more economical on the Rand and other places where tin or gold are got. Perhaps a suggestion of the lines upon which the thing could be worked may not be amiss. It appears to me that the elastic properties of compressed air should be used, but that the air should not be compressed on the surface and distributed to the workings, that it should not even be compressed in the workings, and conveyed to the drills, though that would be a distinct advance, but that the electric motor should compress the air in the working parts of the drill itself. The air should be compressed to a pretty high pressure by the motor, and made to do the work which the springs do now.

*Abstract of article in the London *Electrical Review*.

THE SILVER CITY DISTRICT, IDAHO.

BY OUR SPECIAL CORRESPONDENT.

The Silver City district, within which are the mines of Silver City, Dewey and De Lamar, forms a portion of the Owyhee mountains, situated in the southwestern part of the State of Idaho. The district is reached by the Idaho Northern railway from Nampa to Murphy, thence by stage line, the staging distance being about 30 miles. This mountain range is chiefly granitic, but it contains some basalt and rhyolite. Thus far the principal mining operations have been confined to War Eagle and Florida mountains and the De Lamar section. On the west side of War Eagle mountain is Sinker creek, flowing northerly, thence westerly into Owyhee river. Silver City is between the two mountains named; Dewey is on the north side of Florida mountain, and De Lamar

SILVER CITY, IDAHO.

is five miles westerly from Dewey, all three places being on Jordan creek. The earlier operations, which began in 1864, were principally on War Eagle mountain, where the Golden Chariot vein was opened through six shafts on as many different properties. The workings extended along the strike of the vein for nearly 4,000 ft., the deepest shaft having reached a depth of 1,360 ft. This vein strikes through the granite in approximately a north-south course, having a dip towards the east. The croppings are near the summit of the mountain. Closely associated with the Golden Chariot is the Cumberland vein, which has been developed in more recent years. The Chariot vein, where opened, was from 4 to 6 ft. in width, containing ore-shoots from 4 in. to 6 ft. wide and from 30 to 200 ft. in length, the ores carrying gold and silver, mainly in a quartz gangue. Five years ago, much of the ground through which the Golden Chariot vein passes was acquired by the War Eagle Consolidated Mining Company, which installed an air compressor plant in Sinker creek and has driven a 6,300-ft. cross-cut, intersecting the vein in question at a point 2,100 ft. below the surface and 800 ft. below the deepest workings from the shaft. By driving on the vein from the point of intersection, some gold-bearing copper ore is said to have been obtained, though not specially rich in character. Farther west from the Golden Chariot vein, and paralleling it, is the Poorman fissure, whereon are the quite extensive developments of the Poorman Mining Company. The two fissures are 3,000 ft. apart, and were the Sinker cross-cut continued to Poorman ground, it would open the latter to a depth of several hundred feet below the present workings and effectively drain them. This is mentioned because it appears to embody a plan that is being weighed and considered by some in the district, as a means of re-opening the mines of War Eagle mountain from the Sinker creek side.

The Addie and Calaveras system of veins, lying west of those of the Poorman and paralleling them is opened by an adit level on the Addie proper, the heading of which is in 1,900 ft. A cross-cut from this adit intersects the Calaveras vein, on which drifts are being advanced in good ore. The plan is to continue on the latter 1,000 ft. farther, making a raise at one point to connect with the shaft. The workings aggregate 4,000 ft. of horizontal development. The vein is a rather narrow one, with ore averaging about $20 per ton. The Addie mill, situated at the entrance to the adit level, is equipped with crusher, stamps, plates, vanners and amalgamating pans, with a motor for operating by electric power. The mill is to be started later in the season. The Addie group is controlled by Messrs A. F. Stevens, T. Shay, S. D. McLain and C. C. Hedum, all of Silver City, Mr. Stevens being the manager. A feature of the War Eagle mountain formation is the occurrence of a system of branch-veins, or deflections from the main fissures, in some of which very high-grade ore has been obtained.

The Trade Dollar Consolidated Mining Company, of which Mr. Frederic Irwin, of Dewey, is manager, owns the principal part of Florida mountain, having continuous workings entirely through the mountain from Jordan creek on the north side to Blaine gulch on the south side. This group results from the consolidation of the Trade Dollar, Black Jack and Booneville mines, which were formerly operated under separate ownerships. Florida mountain is granite, but with a capping of porphyritic rock. The principal vein of the group strikes nearly north-south, having a dip to the west, or in a direction opposite to the dip of veins on War Eagle. From this main vein there are many spurs and diverging veins, making a wide zone of mineralization. This mineral belt is opened through five systems of adits and levels from the surface, the highest of these being 700 ft. below the apex of the mountain and the lowest 1,700 ft. below it, giving a vertical face of 1,000 ft. between the highest and lowest planes of development, and these are connected by vertical workings. The five systems are known as the Trade Dollar upper workings. Booneville upper workings, Blaine, Black Jack and Dewey. The last named is, more properly, the Florida mountain tunnel, which starts about 35 ft. above the bed of Jordan creek, at Dewey, runs southeasterly 4,400 ft., striking the main vein at this point and running thence southerly 5,600 ft., chiefly along the strike of the vein. This level is connected by a 500-ft. raise with the Blaine level, which enters the mountain from the south side. The Florida mountain tunnel receives all the ore from the levels above it, being the channel through which the ore is hauled out to the mill at Dewey. The principal tonnage now comes from the Alpine, on the 700-ft. level; the Booneville, at 800 ft.; the Black Jack and Blaine at the 1,300-ft. levels. The ore from the Alpine and Booneville levels is in the porphyry capping, all below these levels being in the granite. The gangue is a quartz and porphyritic gouge in the upper levels, but becomes more granitic in the lower levels. The values are in silver and gold, the silver being almost entirely in the form of argentite. The gold is carried in a fine-textured chalcopyrite.

The ore is delivered from the 'tunnel' direct to the crusher floor of the mill; the mule haulage in the adit is to be supplanted soon by electric haulage. The mill handles 50 tons of ore per day, the equipment consisting of crusher, 20 stamps, 12 vanners, 10 amalgamating pans and five settlers. The concentrates produced are high-grade, containing 70 per cent of the entire mill-saving in gold and silver, comprising silver sulphides and copper-iron sulphides carrying most of the gold. The recovery of the finely divided particles of gold and silver in the amalgamating pans brings the total recovery up to 94 per cent of the assay value of the ore. In the latter work about 20 flasks of quicksilver per month are used. The mill machinery, compressors and other machinery are operated by electric power, transmitted from this company's power plant at Swan Falls on the Snake river, 28 miles from Dewey. The current is transmitted as a three-phase system over No. 4 copper wires at 20,000 volts, and is transformed to 480 volts by nine 37.5 kw. transformers at Dewey. The power is transmitted at the original voltage to Silver City, and to the Blaine and Black Jack levels, where there are also transformers. The company employs a force of 250 men on the property.

The Trade Dollar Extension, comprising a group of seven claims on the northeastern slope of Florida mountain, is controlled by a company of that name, managed by Mr. A. F. Stevens, some of the principal stockholders being Salt Lake City people. This group joins that of the Trade Dollar on the west. The location, it is believed, covers a portion of the Nineteen vein and its offshoots, which cut through the Trade Dollar ground. An

electric transformer and air compressor have been installed on the group at the base of mountain, taking power from Swan Falls plant. An air line from the compressor, 3,200 ft. long, extends up the mountain side to a receiver at the mouth of a cross-cut, now in 650 ft., which is designed to intersect the vein with a little further advance. At the compressor plant, a lower level has been started, which will soon cut the vein, when it will then continue as an adit., The ores and conditions here are characteristic of Florida mountain generally.

The mine of the De Lamar Company, Ltd., is under the management of Mr. Ernest V. Orford, assisted by Mr. J. E. McDonnell. The mine was purchased in 1891 by this company, and the property has been operated without cessation during the intervening time. In the earlier operations, when the ores came from the upper levels, the values were largely in sulphides of silver and horn silver, making it principally a silver mine, the precious metals being recovered by stamp-milling and pan-amalgamation. But, as greater depth was attained, the ore became more of a gold-bearing quartz, with a fair amount of silver, and the mill was equipped for cyanide treatment five years ago, whereby the extraction was increased, and the cost of milling was diminished. For the year ending April 1, 1904, about 40,000 tons of ore were milled, of an average value of approximately $11 per ton, the extraction amounting to 85 per cent. The tailings run about $2 per ton, the principal loss being silver. The ore is crushed to about ⅛-in. size, and finer for the leaching vats. Five days are allowed for the leaching, and 1.8 lb. cyanide are used to the ton of pulp. The ores contain various acids, to neutralize which 6 lb. of lime to the ton of ore are added. Precipitation takes place in tanks, in which zinc dust is added to the gold solution, followed by agitation with compressed air and passing of the solution through filter presses to collect the precipitates. The mine is in a rhyolite mountain, on the south side of Jordan creek, the main ore bodies occurring within a primary vein, striking northwest-southeast, dipping from 25° to 55° to the southwest, and within the same general belt are eight or 10 secondary veins, having a like strike and dip, which doubtless may be closely related to the main vein. These veins are usually from 3 to 4 ft. in width. The ore occurs in shoots, pitching to the southeast. The mine is opened through a series of 10 or 12 adit and cross-cut levels, the vein system being opened on its strike, a distance of 1,000 ft. The lowest working level is the eighth, and the principal level above it is the fourth, the ore from these two levels being dumped into 4-ton cars which move by gravity over a surface incline, whereby the ore is delivered to the mill, at the foot of the mountain. A tunnel from the south side of the mountain connects with workings from the east side. A mill tunnel, 500 ft. below the present lowest working level, was driven 3,500 ft. as a cross-cut, there striking the mineral belt, and was continued east and west for exploring purposes, in all amounting to 2,000 ft. more. One of the branches of this exploration work encountered the main vein, as is supposed, but the ore at that depth was not of paying value, and no further work on this level has been prosecuted. The mill is operated by water power, a steam plant being used during seasons of deficient water supply.

ELECTRIC MINE HOISTS IN GERMANY.

In a paper read before the North of England Institute of Mining & Mechanical Engineers, April, 1904, W. C. Mountain stated that the two best examples of electric hoists for main shafts in Germany are at the Zollern II colliery at Merklinde and the Preussen II colliery near Dortmund. The Zollern II has the finest equipment of any colliery in Germany, the power-house being a steel and brick building, 330 ft. long and 8 ft. wide with stained-glass windows and a glass-dome roof. The engine, said to be the largest electric hoist in existence, has a drum of the Koepe type, 19.68 ft. in diameter, and uses a road steel wire rope 1.97 in. in diameter. The engine is now hoisting from a depth of 984 ft. An electric motor is fitted on either end of the drum, the shaft running in two bearings on the outer ends of the motors. This shaft is 20.5 in. in diameter at the bearings, 23.62 in. long in the journals, and 25.91 in. in diameter at the drum-boss. The distance between the center of the bearings is 18.05 ft. and that between the centers of the motors 8.20 ft. The present maximum hoisting speed is 32.81 ft. per second, but any speed can be obtained from 1 ft. to 64 ft. per second. The ultimate depth from which the engine will hoist will be 3,600 ft. At present the engine hoists about 40 5-ton loads, or 200 tons of coal an hour. The cage itself weighs 4 tons, and the six cars 2.4 tons.

The direct-current motors are of 705 normal h. p., take current at 500 volts, and make from 51 to 64 revolutions a minute. The armatures are coupled directly without switches to the generator armature of the motor generator, and all starting, stopping, speed regulation and reversing is done by one switch, operating a resistance in the shunt field of the motor generator. An indicator in front of the engineer shows the position of the cage in the shaft, while a connected safety device prevents the maximum speed being exceeded, and automatically retards the speed when the cage is nearing the surface. A compressed air brake is used.

The motor generator consists of a direct-current motor and generator coupled together through a heavy flywheel, this being the Ilgner arrangement for applying the energy stored in a heavy revolving flywheel to provide the starting effort to accelerate the hoisting engine. The flywheel is 12.5 ft. in diameter, has a rim 2 ft. 7 in. wide and 1 ft. 1 in. thick, and weighs 45 tons. Its peripheral speed is 14,000 ft. per minute. The engine hoists 40 times an hour, the hoisting taking about 45 seconds, and the running on and off of cars about 45 seconds. The flywheel, therefore, never reaches its full speed, and the average input into the motor side varies from 250 to 450 amperes at 520 volts, or 130 to 235 kw., or a variation in power of a little over 100 kw. on the steam generators. The variation, while the engine stopped and started many times, was only about 70 h. p. for minutes at a stretch, thus showing the efficiency of the flywheel in providing the necessary starting effort. The variation in voltage on the steam generator was less than 5 per cent. All the machinery at the colliery, the air compressors, Rateau ventilating fans, coal washery, etc., is driven by electricity, the total power consumption being 773 h. p. when hoisting 1,000 to 1,500 tons a day from a depth of 984 ft. The coal consumption necessary is 2 to 2.5 per cent of the output.

At the Preussen II colliery a three-phase motor is direct-coupled to the hoisting drum shaft. The motor develops 950 to 1,500 brake h. p. at 53.5 revolutions per minute, 2,000 volts and 340 amperes. The shaft is 1,800 ft. deep, and the speed for hoisting coal 52 ft. per second. The cage carries six cars, a total of 3 tons of coal. The arrangement, though simple, is not regarded as satisfactory, as there is an enormous drop in pressure when the hoisting motor is switched in, and an automatic regulator is to be fitted to keep the pressure more constant.

At the Arnim coal mines at Zwickau a hoist has a three-phase motor of about 80 h. p., taking current at 500 volts. This hoist is placed directly above the shaft, there being no hoisting sheave. The principal advantage is, of course, the lessened wear on the rope, which is bent but once. At the Consolidated Potash works at Westeregeln, a hoist is driven by a continuous motor of 60 h. p., taking current at 500 volts. This hoist has a brake fitted with an electro-magnet, which acts automatically when the current is cut off.

Mr. Mountain, in a discussion that followed the reading of his paper, stated that the Zollern was a new colliery, and no pumps are in use there at present. He had found that in Germany the speed of output was only about half that in England. Thus, at one colliery with a fine engine hoisting from a depth of 1,500 ft., about a minute was required for hoisting, and about a minute and a quarter to run the cars on and off the cage, while 25 men were employed at the surface to handle an output of 1,100 tons a day, though the equipment had cost altogether $1,125,000. The steam machinery at the Zollern colliery boiler house cost $625,000 and the utmost production was 3,000 tons in 16 hours. An English manager would want to produce that quantity in half the time. Mr. Mountain believed that there were about 30 electric hoisting plants at mines in Germany. He considered the only really practical system he had seen was that at Zollern, where the hoisting motor absorbed a constant of only 300 h. p., while the power taken from it varied from nothing up to 1,500 horse-power.

WIRE ROPE MADE BY THE ANCIENTS.—The wire rope is generally considered a modern invention a product of modern skill, and it will surprise many to learn that its manufacture is really a re-discovered lost art. The excavations at Pompeii have brought to light a piece of bronze wire rope nearly 15 ft. long and about 1 in. in circumference. This rope is now in the Musio Borbonico, at Naples. Messrs. Broderick & Bascom, of St. Louis, have published an illustration of it. It consists of three strands laid spirally together, each strand being made up of 15 wires twisted together, and its construction does not, therefore, differ greatly from that of wire rope made today. Pompeii was buried A. D. 79, but how long wire rope had then been known it is impossible to tell, although, judging by the knowledge shown in the construction of the Pompeii rope, it may be safely concluded that it had been known for a considerable time.

As to rope tramways it is said that they were in use as early as 1644. A tramway was built in that year by the Dutch engineer, Adam Wybe, which was used to carry, in small buckets, dirt from a hill named Der Biscoffsberg, over the town moat to the fortifications of Dantzig.

RADIO-ACTIVE MINERALS.

By R. W. BROCK.

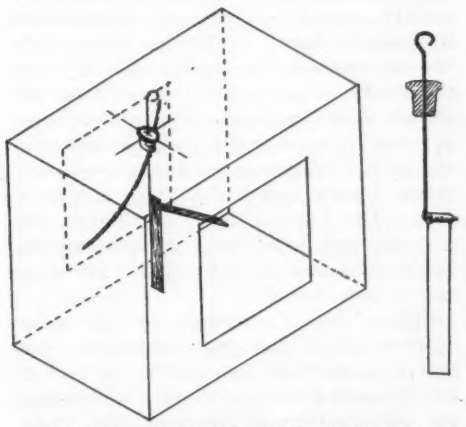
The great scientic interest attaching to the new element radium, and its present extraordinary monetary value, have stimulated a widespread search for minerals containing the precious material. So far, all the commercial salt of radium has been obtained from Austrian pitch-blende. The action of the Austrian government in prohibiting the export of their material, has added a further incentive to the search for American ores of radium. That radio-active minerals occur in America has already been proved. Mr. Obalski has discovered it in probably economic quantities in pitchblende, and in a coal-like substance, occurring together in a pegmatite in Quebec.[1] It has also been found by Prof. McLennan in petroleum and gas of southwestern Ontario.

With the view of determining something of the mode of formation and occurrence of the substance, a number of minerals were tested with the results recorded below. The task has only as yet been begun, but as it will have to be laid aside for some time it appeared desirable to publish the results so far obtained as perhaps affording a slight guide to those who may wish to join in this interesting and important search.

Mode of origin.	Mineral.	Occurrence.	Rate of discharge per hour.
Igneous	Sodalite	Eastern Ontario	4°
	Magnetite	" "	8°
Aqueo-igneous	Columbite	Eastern Ontario	0°
	Columbite spec. 2	" "	15°
	Tourmaline	" "	8°
	Beryl	" "	43°
	Beryl spec. 2	" "	85°
	Beryl spec. 3	" "	15°
Pneumatolitic or igneo-aqueous	Phlogopite	Eastern Ontario	10°
	Apatite	" "	8°
	Apatite spec. 2	" "	0°
	Tourmaline	" "	0°
	Pyroxene	" "	0°
	Molybdenite	" "	0°
Ores deposited from solution	Tetrahedrite	Lardeau District, B. C.	0°
	Auriferous quartz	" " "	7°
	Oxidized copper ore	Boundary Creek, B. C.	5°
	Niccolite	Temiscamingue, Ont.	0°
	Native silver	" "	10°
	Smaltite	" "	3°
Hydrocarbons, usually considered of original but held by some to be volcanic emanations	Albertite	New Brunswick	1°
	Anthraxolite	Sudbury, Ont.	10°
	Asphaltum	Trinidad	4°
Veinstones, such as sometimes accompany pitch-blende	Graphite	Eastern Ontario	5°
	Graphite	" "	0°
	Barite with a little anthraxolite	North of Kingston, Ont.	15°
Sedimentary origin, but accompanying gas and oil	Celestite	Kingston, Ont.	10°
	Salt	Southwestern Ontario	0°

Two properties of radio-active substances make it easy to recognize them. They have the power of discharging an electroscope and they affect a photographic plate. A very simple electroscope, such as may be purchased cheaply or may be made by any one at a cost of a few cents and a very little time, will serve for the first test. A small box a few inches each way, preferably of metal, has windows cut in the opposite sides and fitted with glass so that the action within may be watched and, at the same time, air currents be excluded. In the top, near one end, cut a small hole, say 0.33 in. in diameter. A piece of copper wire a couple of inches long is bent into a ring at the top and bent at an angle of 90° at the bottom on this is attached a narrow band of copper, ¼ in. wide and about 2 in. long, bent at one end to grip the copper wire. On the wire place a cork of insulating sealing wax, made by heating the sealing wax and moulding it around the wire. This is intended to suspend the copper plate within the box and prevent its contact with the sides of the box. Anneal the wire and wax in a flame to drive off the moisture and salts left by the fingers. Now cut a strip of gold or aluminum foil a little shorter than the copper plate and attach it to the latter at the upper end by a tiny hinge of gummed paper. With the forceps drop the plate and foil into the box through the hole in the top. It will be held in place by the sealing wax insulator. The accompanying sketches show the box and the galvanometer.

A platform which may be raised or lowered may be attached to the floor of the electroscope to hold the test mineral which is placed in the box beneath gold leaf and the box closed. The electroscope is then to be charged by a piece of ebonite rubbed on the hair or on the sleeve and touched to the bent wire projecting from the top; when charged the strip of foil will stand out at right angles from the copper plate. A protractor or a scale divided into 90° may be placed behind the electroscope in such a position that the angle at which the foil stands may be read off. It is best to use a fixed line of some kind in front of the electroscope to sight along to make sure that the eye is in the same position for the different readings. Now observe the rate of fall of the gold leaf. If it drops not more than 5° in an hour the insulation is sufficiently perfect for use. If more, the wire with attachments is removed and the wax insulator improved, re-annealed and replaced, being careful not to touch it with the fingers



A SIMPLE TEST FOR RADIO-ACTIVITY.

after annealing. When the insulator has been proved or the rate of leakage determined, the electroscope is ready for use. This test should be repeated at intervals to prove that the insulation remains undisturbed, if positive results are obtained. Slight changes may be noticed, due to variation in atmospheric conditions.

In the photographic tests the procedure is similar to that in X-ray photography. A plate-holder is loaded, a coin, key or other substance opaque to the rays is placed on it and the mineral suspended or placed above the object to be photographed. After an exposure of several hours or days, the plate is developed. If the mineral be radio-active, and a sufficient exposure be allowed, the outline of the object photographed will be discernible on the plate. This experiment is best carried on in the dark as there is then no danger of any leakage of light into the plate.

The rate of discharge given in the table at the top of the page cannot be taken as indicating absolutely the relative degree of radio-activity of the different minerals tested, as the size of the specimen and surface exposed was not the same in all causes. Corrections have been made for the natural leakage in the electroscope.

For the sake of comparison it may be stated that one specimen of the Austrian pitchblende, discharged the electroscope (90°) in 5 min., and another from Joachimsthal, Austria, with a large amount of gangue required only 15 min. in which to discharge the instrument, from which it is manifest that none of the above mentioned minerals is sufficiently radio-active to be of commercial interest. Mr. C. W. Knight, experimenting with the action of the beryl and Sudbury anthraxolite on photographic plates, obtained photographs of metallic objects after five days' exposure.

The Austrian pitchblende occurs in veins associated with silver, cobalt and nickel minerals, with some barite occurring as gangue. These ore deposits are supposed to be genetically connected with dikes of granite which occur in the same locality. The association of the radium-bearing blende with barite is perhaps worthy of note, since radium belongs to the same chemical group (group II, calcium, etc.) and at the barite end of the group. Prof. Marckivald has isolated highly radio-active tellurium from this pitchblende. The radio-active pitchblende and carbonaceous material of Quebec, already referred to, occur in a pegmatite somewhat similar to that in which the above mentioned columbite, beryl, etc., occur. Radio-activity has been shown by Prof. McLennan to characterize gas and petroleum in western Ontario and by Prof. J. J. Thompson to be noticeable in gas in well water. In iron deposited from the hot springs at Bath, England, radium has been shown to occur.

In the results of the experiments given above there are some points of interest. Thus, it is to be noted that many minerals of pegmatite containing the rare elements, or of complicated composition, show radio-activity.[2]

It is also interesting to see that the silver-cobalt ores of Temiscamingue,[3] which are similar in composition to those accompanying pitchblende in Austria, are slightly radio-active, and that compounds of strontium and barium which are chemically related to radium may show radio-activity. The barite tested occurs in a vein traversing Ordovician limestone seven miles north of Kingston, Ontario. It is also worthy of note that hydrocarbon minerals besides oil and gas, show this property.

The Sudbury anthraxolite[4] which resembles anthracite occurs, like the New Brunswick albertite, in a vein, and has no doubt been formed in the same way, by the bituminization

[1] ENGINEERING AND MINING JOURNAL, Vol, LXXVII, p. 441, March 17, 1904.

[2] A description of the minerals in this pegmatite will be found in the *Report* of the Bureau of Mines, Ontario, for 1898, pp. 234-237.

[3] ENGINEERING AND MINING JOURNAL, December 10, 1903.

[4] Described in the *Report* of the Bureau of Mines for Ontario, 1890, pp. 159-166.

of petroleum-like material which welled up in a fissure.

The auriferous quartz of the Eva mine was tested on account of its resemblance to an ore found in the Venus mine in the same part of British Columbia in which uranium oxide is reported to have been detected.

While uranium-bearing minerals are, so far as known, the most highly radio-active, it is seen from the above that radio-activity may be looked for in minerals occurring in a variety of ways and in which the presence of uranium has not been recognized or suspected, and that much work is necessary before laws regarding the occurrence of radio-active substances may be formulated.

Besides the known uranium compounds, minerals whose origin is directly or indirectly connected with igneous intrusion, carbonaceous minerals, and minerals containing bases chemically related to radium, would appear in the present state of our ignorance to afford the most promising materials for investigation.

If it be proved that deposits formed by, or genetically connected with, igneous activity are richest in radio-active minerals, it may be possible to use this fact as evidence in support of the connection between certain ore-deposits and vulcanism, and those who advance the theory of the volcanic origin of oil and gas would see in the widespread radio-activity of these substances an argument in favor of their, at present, somewhat unorthodox contention.

COAL-FIELDS OF SHANTUNG.—A bulletin issued by the German Admiralty, extracts from which are published in *Glückauf*, gives some information about the development of the coal-fields of the Kiutschu district and of Shantung. A geological survey of the Shinling-shan island, south of Tsingtan, showed traces of anthracite coal with the possibility of workable seams being formed by boring, as the stratification resembles the Fang-tse coal-field. In Shantung the Shantung Bergbau Gesselschaft is opening a seam struck by the Fang-tse shaft, and is to sink another shaft. The seam opened is at a depth of 574 ft. and is 13 ft. thick. Another seam, 131 ft. above, is of equal thickness, but is broken by intrusions of porphyry. Similar intrusions may interfere with working the bottom seam. The coal sells readily to Chinese consumers, but contains too much ash to be suitable for railway or steamship use. This has retarded the development of the colliery, the output for the past year averaging only about 100 tons per diem, though within the past few months it has reached 260 tons. A mechanical screening plant has just been erected. The same seam has been tapped at greater depth by a bore-hole about a mile to the north of the Fang-tse shaft. The proprietors have decided to sink a second shaft here, with a large surface plant, and operations will begin in a short time.

Unexpected difficulties were encountered in proving the Po-chan coal-field. The bore-holes sunk in the northern part of the field either proved barren or showed nothing but anthracite unsuitable for ship's use. Holes bored nearer the center of the field, tapped seams which—so far as could be judged from the cores—contain gassy coal of good quality. It has been decided to sink a shaft in this part of the field, and the prospects of success have greatly improved, owing to the discovery, in an adjacent bore-holes, of two seams—one 5 ft., the other 15.5 ft. in thickness—at depths of 197 and 89 ft., respectively.

DIAMOND DRILLING IN AN ARIZONA COPPER DISTRICT.

By DWIGHT E. WOODBRIDGE.

In the Warren copper district in Arizona the use of the diamond drill is rapidly increasing, and it is probably a fact that more drills are now working here than in any other section of similar area in the United States. There has been a great deal of discussion, pro and con, as to the availability of diamond drills for operations in the formation of the Warren district, and some experienced companies will not use it at all. The Copper Queen Consolidated Mining Company is one of these. Mr. Walter Douglas, its superintendent, told me that they had used drills a number of years ago, but that they had been unsuccessful in finding ore-bodies that had subsequently been cut by drifts following the drill holes, and that they did not care to enter upon the exploration of their mines by that method.

The use of drills in the Warren district is due to the initiative of the Junction Development Company. Now the Junction ground is all conglomerate on surface, and its possible value for copper depended on the conclusion that might be reached as to whether or not the copper-bearing lime rocks of the district dipped beneath this conglomerate toward the porphyry contact or whether the conglomerate continued in depth. In this case the use of a drill to determine the question was not only permissible; it was business sagacity, for the ground, if in lime, might be exceedingly rich and could be secured at a low price, while the cost of drill exploration, to determine the formation merely, was far less than that of a shaft. The Junction's drill explorations did show that lime dipped under the conglomerate, and there is now possibility that a fine mine may be developed there.

Mining methods adopted by the Lake Superior people operating the Junction had been so wonderfully successful in the case of their Calumet & Arizona, Calumet & Pittsburg and other earlier developments, that many others, exploring the same field, were ready to follow their methods without applying the proper reasoning to their own conditions. They did not appreciate that the diamond drill in Bisbee was valuable for negative, not positive, results. So diamond drilling became more or less of a fad. Drills are at work in properties where they can be of little value. They do worse; they may condemn ground deserving better exploration than the drill can give. Another reason for exploration by the drill, and this time in ground admittedly lime, has been on financial accounts. Some mining companies here have been so hampered by the lack of sufficient funds with which to explore by the much more expensive work of shaft sinking that they have taken up drills as a last resort, hoping that something might happen before their funds were exhausted, and that, if it did they might secure additional money with which to explore by shafts and drifts. This is the excuse for the operation of drills on several prospects in the district.

Really, the only successful way to explore in this district, except under such conditions as I have outlined above, is by shaft and tunnel. Frequently it has been found that large and valuable ore lenses have been opened by following weak and narrow stringers of ore to their conclusion. There is about as much hope of cutting these stringers with a drill as of finding a needle in a haystack. Ores are sometimes such that neither cores nor sludge give much indication of their presence. The ore lenses are irregular in shape, and no surface sign is assurance of their outlines, or actual position. It is exceedingly easy, not only to miss them by the small hole bored by a drill, but to fail in noting from its results the slightest evidence of their presence.

Diamond drill work at Bisbee is conducted, if statements of operators are conclusive, at costs varying from $2.50 to $5 and more per foot. In the opinion of one of the leading drill men of the United States, who has been making examination of the region, a fair price for a considerable time will be near the latter figure. The ground is not easy. The glance conglomerate is very hard and irregular in texture, lime is broken and variable in quality, much of it is extremely cherty, and the wear from the stones is considerable. The type of drills generally used is the Sullivan H or C, with the A rods, cutting a hole 1 13-16 in. and making a core a little better than one inch in diameter. In one or two cases E rods have been adopted for an H drill, but this is a mistake of judgment on the part of the operator. A few S drills are operated underground, in order to test the mineral-bearing possibilities in a deeper Carboniferous lime stratum, hitherto untouched in the Warren district. This is the case with a drill or two operated in the bottom levels of the Calumet & Arizona mine. It is pleasant to announce that these drills have proved the mineral-bearing ground to extend in depth far beyond the lowest horizon yet exploited.

Drills are in use at Bisbee in the Calumet & Arizona mine and on the property of its associated Junction Development Company by the Calumet & Cochise, Calumet & Bisbee and Wolverine & Arizona, all associated companies; by the Higgins Development Company, the Houghton Development Company, the Copper Glance Mining Company, the Portage Lake & Bisbee and the Saginaw Development Company. Most of these are operated by the mining companies themselves, without the intervention of a contractor, though the Saginaw Development Company has let a contract to a Minnesota firm for its work. The ground of this company, all of which lies to the east of the big 'Dividend fault,' is cut by steeply dipping beds of quartzite, lime and the underlying schist. So that, although ore has been found in the shaft sunk by former operators, it is the part of wisdom to explore quite fully by drill before carrying forward much expensive development. At the Copper Glance a drill was not set to work until a shaft had been sunk 540 ft. in conglomerate, and the company had spent many thousand dollars in an unsuccessful attempt to keep the water down at that depth. Drills should have been started there two years before they were. The Calumet & Cochise and the Calumet & Bisbee would be unable, without additional money, to carry forward drifting more than a very few months. Drill-work at the Higgins is, in my opinion, quite unsatisfactory, though the management has set its figure at 6,000 linear feet, and has two large machines employed. At the Calumet & Pittsburg a drill was employed for a time, as it was impossible to gain depth in the shaft on account of an enormous flow of water. and the management wished to know if leaching and oxidation extended to any considerable depth below water level.

The experience of this locality is therefore like that of other regions in emphasizing the need of judgment in the use of the drill.

THE BRISTOL THERMOMETER-THERMOSTAT.

The Bristol Company of Waterbury, Conn., is placing a new instrument upon the market which has been given the compound name above, since it is a combination thermometer and thermostat. There is a demand for an instrument of this character which will give correct indications of the temperature of the atmosphere, gases or liquids at all times, and also serve as a thermostat to make electric connection at any predetermined limits of temperature for the purpose of operating controlling apparatus, alarms and the like.

Fig. 1 shows an external view of the instrument which is provided with a 6-in. scale

FIG. 1.

graduated in degrees Fahrenheit. The construction and capabilites of this instrument will be best understood by referring to the interior view, Fig. 2, in which *A* is an arm pivoted at lower portion of the case, terminating in a point resting on the arc of the graduated

FIG. 2.

scale and is held by frction at whatever point it may happen to be set. Two adjustable contact pieces, *B* and *C*, are carried by this arm. These contact pieces are capable of adjustment by means of a screw *D*, which is threaded so as to cause the contact pieces *B* and *C* to approach or recede at equal rates and distances from the center line of the arm *A*, upon which they are supported. They are also connected to binding posts as shown, which are used for making outside connections. These binding posts are located within the case to avoid any possibility of the wires or connections being disturbed without detection. Three holes, with insulating eyelets, are provided in the lower portion of case, as shown, for the insertion of connecting wires. The high and low contacts can be placed on a single or on independent circuits. The arm *E*, moving over the graduated scale, indicates the changes of temperature where the instrument is located. This arm is operated by one of Bristol's recording thermometer tubes placed in the perforated protecting projection extending from the back of the case as shown in the illustration. On the back of the indicating pointer *E* there is a raised portion which makes electric connection with the contact pieces.

A novel feature of the instrument is that the temperature indicating arm *E* is not restrained by the thermometer-thermostatic contacts. Thus it will be seen that the controlling effect of the thermostat is perfectly adjustable as to position on the scale of the thermometer, and also as to high and low limits of operation, without in any way interfering with the correct indications of the thermometer in case the temperature does not remain, or is not controlled, within the limits for which contact pieces may be set.

The instrument may be readily applied to liquids, as, for instance, to indicate the temperature, and set into operation controlling apparatus for the brine in refrigerating system or tank.

For temperature above the atmosphere, as that occurring in ovens, kilns, closed spaces, or of liquds in pipes under pressure, a small bulb is located within the closed space or pipe. This bulb is connected with the thermometer-thermostat by a capillary tube filled with alcohol. The temperature at the bulb is communicated to the instrument which may be located at any convenient point for observation. The electric wires connecting with the adjustable thermostatic contacts may be carried to any point where the controlling apparatus may be located or where it is desired that an alarm shall be given.

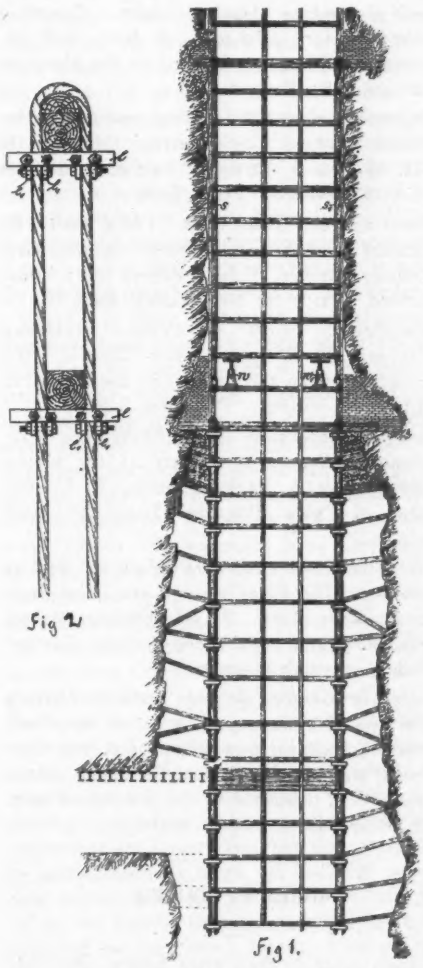
From the foregoing description it will be seen that the instrument is very flexible in its application, and it is not improbable that other applications may suggest themselves to the reader which have not been thought of in the preparation of this description.

REPAIRING A CAVED SHAFT.*

Some time ago the timber-lined shaft at the Friedrich Wilhelm colliery, Dortmund, which was sunk early in the sixties, suffered damage from a tub loaded with waste having slipped partly out of the ascending cage, owing to an omission to put in the stop bar. About 100 ft. of the shaft wall were so damaged that a collapse of the timbering took place and the shaft caved in. It was at first proposed to fill up the damaged portion, but this idea was abandoned on account of the injury that would have accrued to the pumps through prolonged exposure to the action of the acid mine water, and the following method was adopted:

The first step was to secure the timbering still remaining above the seat of the accident, and this was done by constructing a framework of timber 15 to 25 meters above the fractured portion. From eight places on this framework (*s* to *s'*, Fig 1) corresponding lengths of old winding ropes were suspended by 5-c. m. hooks, similar hooks at the bottom ends of the ropes being slipped under another framework just above the breakage. Screw-jacks *w' w''* were inserted between the two frames, so as to bring the ropes into tension, which done, the new timbering was bolted on to the old, and the latter thus prevented from falling. The repairing staff worked on stages suspended in all compartments of the shaft, and as these stages could be all lowered to the same level, it was possible to work on all sides of the shaft at once.

In repairing the damaged portion, supporting beams for the new framework were put in position where the extent of the caving permitted, but where the space was too large for the length of a single beam, a similar metnod of suspension to that already described had to be employed, lengths of old winding rope being slung over the firmly-supported framework, as shown in Fig. 2. Immediately below the support, and at intervals of 1 m. lower down, the two parts of each rope were lashed



REPAIRING A CAVED SHAFT.

together, as shown at *l*, the lashing being supplemented by cross lashings *l'*. Each of these lashings subsequently served to support the new timbering, and this arrangement facilitated the work, the ropes insuring verticality. At suitable intervals the framework was stayed by props from the sides of the cavity (Fig. 1), and after laying boards over each ring of props, the intervening space was packed with faggots. Thanks to the use of rope suspension, the work proceeded apace, as much as 6 m. a day being got through in places where the caving was least, so that within 11 months the shaft was repaired down to the 448-m. level, the broken steam and compressed-air pipes being also restored, and the pumps set ready for work. The task was greatly facilitated by the possibility of removing the caved earth at the said level and using it for packing.

*Abstract of article by Betribsführer Preir, in *Glückauf*, March 5, 1904.

BOOKS RECEIVED.

In sending books for notices, will pubishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

Notice sur les Mines d'Or et d'Argent de la Republique de Honduras. By Henry Jalhay. Brussels, Belgium; Vve de Backer. Pages, 48.

The New Geology and Vein Formation. By Franklin R. Carpenter. Denver, Colo.; the Colorado Scientific Society. Pamphlet, 8 pages.

The Michigan Technic. 1904. Ann Arbor, Mich.; published by the Engineering Society of the University of Michigan. Pages, 114; illustrated.

Field Columbian Museum. Annual Report of the Director. 1902-1903. F. J. V. Skiff, Director. Chicago; published by the Museum. Pages, 248; illustrated.

National Iron and Steel, Coal and Coke Blue Book. Second Edition, 1904. Edited by B. H. Morwood. Pitsburg, Pa.; R. L. Polk & Co. Pages, 888. Price, $7.50.

Grundzüge der Siderologie. Third Part. By Hanns Freiherr von Jüptner. Leipzig, Germany; Arthur Felix. Pages, 152; illustrated. Price (in New York), $2.25.

Solubility of Gold in Certain Oxidising Agents. By Victor Lenher. Easton, Pa.; reprinted from the *Journal* of the American Chemical Society., Pamphlet, 8 pages.

Biological Laboratory of the Philippines. Preliminary Report on Insects of the Cacao. By Charles S. Banks. Manila, P. I.; Bureau of Public Printing. Pages, 58; with plates.

Wisconsin Geological and Natural History Survey. The Plankton of Lake Winnebago and Green Lake. By C. Dwight Marsh. Madison, Wis.; published by the Survey. Pages, 96; with diagrams.

Wisconsin Geological and Natural History Survey. Preliminary Report on the Soils and Agricultural Conditions of North Central Wisconsin. By Samuel Weidman. Madison, Wis.; published by the Survey. Pages, 68; with maps and illustrations.

BOOKS REVIEWED.

Geologic Atlas of the United States. No .105. *Patoka Folio, Indiana-Illinois.* Washington; engraved and printed by the Geological Survey. . Four maps and 12 pages text. Price, 25 cents.

The Patoka quadrangle is an area, 34.5 miles long north and south by 27.2 miles wide, in southeastern Indiana and southeastern Illinois. Its southern boundary is only 2 miles from the Ohio river at Evansville, its northwest corner 17 miles west of the Wabash river, and it includes the larger part of Vanderburg, Posey and Gibson counties in Indiana and Wabash county in Illinois. The rock formations belong to the Carboniferous, Tertiary and Quarternary systems, the Tertiary being represented by sands and gravels about 6 ft. thick in all and the Quarternary by glacial, inter-glacial and post-glacial deposits. The quadrangle is east of the center line of the Illinois-Indiana coal basin, hence the rocks dip west and north. The Carboniferous is represented in ascending order by the Millersburg sandstones and shales, about 170 ft. thick, the Somerville limestone and shale, 20 to 35 ft. thick; the Ditney formation-sandstones, shales and coals, 20 to 50 ft. thick; the Inglefield formation, mostly sandstones, 110 to 150 ft. thick and the Wabash formation, shales and sandstones, with occasional thin beds of coal, having a total thickness of about 180 feet.

Regarding the coal seams, it appears that in the Indiana portion of the quadrangle but two mines, the Oswald at Princeton and the Diamond, near Evansville, are worked. These reach what is known as the Petersburg coal, which at the Diamond is 4.5 ft. thick, with a band of sulphur near the middle and at the Oswald about 6.5 ft. thick with no regular sulphur or clay bands, but with thin bands of sulphur in places. The coal seam is found at a depth of 250 ft. at the Diamond mine and 450 ft. at the Oswald. The Millersburg coal, 18 in. to 3.5 ft. thick, is not mined in the quadrangle, neither are the thin, or unimportant, Parker, Friedensville and Aldrich coals. Coal seams of undetermined stratigraphical position are worked, or have been worked, by stripping at several places, one being a bed 14 in. thick worked at the Wharf mine, near Hazleton. In the Illinois portion of the quadrangle, across the Wabash valley, the only coal of importance is the Friedensville, which outcrops near the town of that name, and at its best is about 3 ft. thick. It underlies a considerable area, but pinches out rather sharply to the east. It is mined near Friedensville and Bellmont. Other mineral resources of the quadrangle are clays and building stones.

The Alternating Current Transformer. By F. G. Baum. New York, 1903; McGraw Publishing Company. Pages, 195; illustrated. Price, $1.50.

The subject of the alternating current transformer is handled by the author of this book in an admirable manner. The text is clear and concise, unburdened by complicated mathematical formulas beyond what are absolutely essential, and the treatment is well rounded and thorough. The general reader who has a fair knowledge of the theory of alternating currents can follow the discussion intelligently.

Register of Mines and Minerals of Kern County, California. Prepared by the State Mining Bureau; Lewis E. Aubury, State Mineralogist. San Francisco; published by the Bureau. Pages, 24; with maps. Price, 25 cents; postage, 8 cents.

This recent issue of the State Mining Bureau is a map and register of Kern county, the principal oil-producing region of California. State Mineralogist Aubury has taken considerable trouble to have this register full and complete, especially with the list of oil wells, etc. In addition to the large new map of the county there are in the register special detailed maps of the Kern River field, the McKittrick, the Midway field and the Sunset fields, showing in each case producing wells, abandoned wells, wells drilling, wells of doubtful productiveness, oil tanks, oil pipe lines, etc. These smaller maps, compiled by Paul W. Prutzman, are drawn to scale by section and the exact location of each well indicated. Small figures within circles show the gravity of oil produced at the points indicated. The elevations are all given. Then the main register gives a list of all quartz mines, placers mills and arastras, mineral springs, miscellaneous mines, and finally a list of oil wells. In the quartz mine list are given name, exact situation, character of ore, width of vein, character of hanging and foot wall, details by measurement of development work, number of men employed and address of owner, manager or superintendent. In the case of the oil wells the register gives names, location, district, character of formation, number of wells being pumped by each operator, tankage capacity, pipe lines, depth of wells, with addresses of owners and superintendents, etc. This register and map is sold by the State Mining Bureau for cost of publication merely—25c., with 8c. postage added.

The county of Kern is remarkable in many particulars from a mineral bearing point of view. It is characterized by a greater variety of topography, geology climate and resources than any other county of the State. It has an area of 8,159 square miles, and includes the slopes of two mountain ranges, a large and fertile valley plain and an arid desert region. All these contrasted regions contain much mineral wealth. On the Sierra slope, amid forests and streams, are important quartz mining districts. In the valley plain near Bakersfield is the widely known Kern River oil-field, the most productive in the State. On the eastern slope of the Coast range are the Sunset and McKittrick oil-fields. The foothills of both these ranges abound in various minerals. In the desert region is the Randsburg gold district and other gold districts are being developed on the desert side of the Sierra. Kern county ranks first among the counties for product of petroleum, second in total annual value of all combined mineral products and fifth in yield of gold. In addition to the oil, gold, asphalt, silver, lime, copper, clays, fuller's earth and gypsum now mined or worked, there are deposits of iron ore, coal, lead, mica, borax, salt, graphite, antimony, fire-clay, marble, steatite, sulphur and building stones. The petroleum fields of Kern county are the most productive in the State and extend over considerable area. The Kern River field, yielding more than any other in California, is on the eastern margin of the San Joaquin valley, with producing wells covering an area of about 3.5 miles square. The depth of wells is from 600 to 1,200 ft. In the center of the field the oil-bearing ground averages 350 ft. in thickness. An 8-in. pipe-line connects this field with the refineries at Point Richmond, on San Francisco Bay, the line being 278 miles in length. The Sunset field is in the southwestern part of the county and the Midway in the same part on the eastern slope of the Coast range. The McKittrick field in the western part. The storage tank and reservoir system connected with the oil-fields is of an extensive character. There are in the county 129 reservoirs, having an aggregate capacity of 5,571,100 bbl. and 214 tanks with an aggregate capacity of 4,292,150 bbl. In addition, storage is being created for 2,500,000 bbl. more. The irrigation systems are the most extensive in the State, making the valley lands very productive. There are 300 miles of main canals and 3,000 miles of side ditches. There is also an extensive artesian well region with flowing water. The county has two electric power systems, and two transcontinental railroads pass through it, with various branch lines.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

Letters should be addressed to the Editor.

We do not hold ourselves responsible for the opinions expressed by correspondents.

Silver Peak.

Sir.—In the article 'The Silver Peak Region, Nevada,' by J. E. Spurr, in your issue of May 12, I notice an error with reference to the Alpine mine at Lone mountain, which is credited with having "shipped over $70,000 worth within the last calendar year." The fact is, the mine shipped over $209,000 worth in that period and $70,000 were distributed in dividends; while the mine is still maintaining its output of high grade carbonate lead ore. Knowing Mr. Spurr's desire for accuracy, I feel sure he will pardon me for correcting this error on his part.

W. J. STONEHAM.

Tonopah, Nev., May 20, 1904.

The Marvin Electric Drill.

Sir.—I have before me your editorial of June 27, 1903. You there give the Marvin drill credit for being the best type of a solenoid drill, and state that *some* of its early defects have been overcome. At the end of this editorial you say, by implication, that no electric drill is made which is durable and will stand the hard service incident to rock work.

The Solvay Process Company has used our drills for seven or eight years, and has now in service some drills which have been at work the entire time. The Alsen American Portland Cement works of Alsen, N. Y., have used our drills since they first started, more than two years ago. The line and drills were cared for by the ordinary quarry laborers, and the generator by the blacksmith, until about the 14th of this month. The drilling is done by contract; the owners furnishing power and drills and the contractor labor and steels. On May 14 and 15 a ground was taken out of the generator, new commutators put in, and the line patched up, without stopping work in the quarry and at a trifling cost.

The Wellman Stone Company, of Portsmouth, Ohio, has in their quarries at Henley four of our drills and some steam drills. They found that the steam drills required more than twice as much coal to cut a foot of hole as our drills did. They had made, up to the first of this month, no repairs of any kind to the apparatus which we furnished.

Now if these statements which I make are facts, has not the time arrived when, in justice to the users of drills, as well as to us, you should state in your editorial columns that there is an electric drill which is a practical machine, and which compares favorably with any other power drill for hard service and low cost of maintenance?

W. E. HOTCHKISS,

Marvin Electric Drill Company.

Binghamton, N. Y., May 25, 1904.

[We append a letter received from the engineer of the Solvay Process Company, in relation to the work of this type of drill.—EDITOR.]

Sir.—In reply to your inquiry as to Marvin electric drills, I would say that my experience with these drills has been very successful. I am now using seven large 'M' drills and two small 'H' drills in getting out 1,000 to 1,500 tons of grey lime-kiln stone per day, 365 days in the year, with drills 1.5 miles from the present power house. The repairs on these drills are very slight and will not exceed $5 per month per drill. I have the ordinary quarrymen to operate them and very litle difficulty is experienced in moving them about the quarry from one location to another, as our line of current overhangs the quarry workings for months at a time, which I find to be a decided advantage over steam and air drills.

I intend to build a new power-house in the quarry and equip it with the new style generators and motors to run the same.

E. H. FOLEY.

Split Rock, N. Y., May 21, 1904.

ABSTRACTS OF OFFICIAL REPORTS.

Tennessee Coal, Iron & Railroad Company.

This company owns extensive coal and iron properties in Alabama, Georgia and Tennessee. These properties include 16 blast furnaces, besides one under construction, steel works at Ensley, Ala., a rolling mill at Bessemer, Ala., 21 iron mines, 24 coal mines, 3,482 coke ovens and two limestone and dolomite quarries. Its landed estate covers 456,852 acres, including that owned by subsidiary companies. The capital account at the close of the year 1903, which is covered by the report, shows that the company had $248,300 in preferred stock; $22,552,800 in common stock; a bonded debt amounting to $11,858,000, besides $1,540,000 securities of the Alabama Steel & Shipbuilding Company, which are guaranteed by this company.

The income account for the year may be stated as follows:

Gross sales and earnings	$13,468,535
Other income	15,020
Total	$13,483,555
Operating charges	8,738,550
Maintenance and repairs	1,411,158
Royalty and replacement funds	356,969
Exploration, etc.	54,454
General expenses	428,871
Total expenses	$10,990,002
Net earnings	$2,493,553
Interest on bonded debt	$739,527
Dividends, preferred stock	19,864
Total charges	$759,391
Surplus for the year	$1,734,162

In the above statement the royalty and replacement fund represent fixed charges set aside out of income to cover depletion of mineral holdings, and also depreciation of plant and equipment. In other words, these funds represent an amortization fund.

The output of the company's mines and furnaces for the year were as follows:

	Tons.
Iron ore:	
Red ore	1,248,689
Brown ore	100,228
Total iron ore	1,348,917
Coal:	
Sold and used directly	2,127,323
Sent to coke ovens	1,900,131
Total coal	4,027,454
Coke made	1,218,764
Limestone and dolomite	272,434
Pig iron made	575,989
Ferro-manganese and spiegel	1,118
Steel ingots made	152,867
Finished steel:	
Billets, slabs and bars	79,977
Rails	39,039
Rolled iron:	
Muck-bar	8,631
Bars	18,602
Plates	6,238

During the year the sum of $2,365,674 was expended in improvements and additions to property. During the three years past a total of $4,027,388 has been expended for such improvements without increasing the capital account of the company. During the same time the net liabilities have been decreased by the sum of $564,409, which has been provided from earnings:

The report says: "Much has been accomplished in the way of improvements in the properties since 1902. Stock bins have been in use for some months at the Ensley furnaces, and they have largely reduced the cost of handling the raw material. An entire set of blowing engines is being installed at these furnaces, which, when completed, will give 18 new modern blowing engines. Several of them are compound. Condensers will be erected and power can be furnished to the steel plant. The old engines, which have been replaced by the new, have been used to reinforce Bessemer and Oxmoor furnaces, thereby increasing the product and decreasing the cost at those plants. The stack and stoves for the modern furnace building at Ensley are up; two blowing engines are in position; the foundation is ready for the third; and the steel frame for the engine-house is up. When the proposed improvements are completed, the six furnaces at Ensley (where the iron is made for the steel plant) will be of the first order.

"At No. 3 Pratt coal mine, electric generators have been placed to supply power for the movement of cars in the mine, to operate pumps and coal-cutting machines and for lighting. The economy and convenience that were expected to result from these additions have been realized and power can be supplied to No. 4 mine from the same station. The new hoists at No. 3 and 4 mines are satisfactory. Minor improvements have been made at other of the Pratt mines. The surface and underground equipment at the Blockton mines have been improved, the product thereby being increased and the cost largely reduced. At the Blue Creek mines an increase in steam power has been secured and a coal washer has been built, by the use of which a better quality of coke is obtained. The re-equipment of the Red Mountain ore mines, which has been under way for more than two years, is nearing completion. This was the largest improvement yet undertaken, but the return will be correspondingly large. It has been heretofore necessary for this company to buy part of its ore supply, because its mines were not prepared for the needed output. Less ore was bought and more was mined by the company in 1903 than in previous years, and the improvements now nearing completion will insure the entire tonnage required for company's operations. At the brown ore mines in Alabama, washers have been erected and steam shovels have largely taken the place of men, this reducing the cost nearly one-half. A limestone quarry was bought within the year and is now prepared to meet any probable demand.

"It has been necessary to make further changes and additions at the Ensley steel plant, the principal ones being a larger blooming engine, a storage furnace holding 250 tons of molten pig iron and a converter. The mill has made rails from 40-lb. to 85-lb. section and the larger sizes are in use on several northern and many southern roads, where they have proved satisfactory.

"At Oxmoor furnaces 2,000 h. p. of boilers

were added; at furnaces No. 1 and 2, Bessemer, 1,250 h. p. of boilers were added and an electric generator installed to furnish light at the five Bessemer furnaces, the rolling mill at Bessemer, and the Muscoda group of ore mines on Red Mountain. At Bessemer furnaces No. 3 and 4, the boilers have been increased 1,750 h. p. By the added steam and blowing power, the capacity of these furnaces has been increased and the cost reduced. The capacity of the Bessemer rolling mill has been increased by additions of moderate cost.

"At the South Pittsburg furnaces, the boiler power has been increased. The brown ore mines at Emerson, Ga., which largely supply the South Pittsburg furnaces with ore, have been equipped with boilers, washers and pumps. No expenditures were found necessary at the Tennessee coal properties, except the installation of a new lowering drum at Whitwell.

"The new construction work which has been approved by the directors, including the new furnace at Ensley, will soon be completed.

"In addition to the large expenditures for new construction the efficiency of the property was fully kept up by the expenditure during the year 1903 of $1,411,157 for repair and maintenance account, all of which has been charged to operating cost. A large saving has been effected in the purchasing department by the use of the new warehouse for storage, making it possible to purchase many supplies in carload lots."

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Decay of Mine Timbers.—Can you inform me what is the principal cause of the rapid decay of mine timbers? Is it due to acid in the water, or to some species of decay caused by vegetable growth?—T.

Answer.—The chief cause of rapid decay of mine timbers is found in fungoid growths, induced by the constant exposure to moisture underground. This moisture, alone, has a tendency to promote decay. The acids usually found in mine waters do not affect the timbers.

Phosphate Imports.—Can you give us particulars of the 136,531 tons of phosphate imported into the United States in 1903, as estimated in the JOURNAL for January 7, 1904? C. B.

Answer.—The JOURNAL's estimate of imports was based on the monthly reports of the Bureau of Statistics, Department of Commerce and Labor, which gives the total for 1903 at 132,864 tons 'crude phosphates,' valued at $679,112, free of duty. This quantity certainly seems large, when it is considered that the exports of domestic phosphate rock in 1903 amounted to 785,259 tons—nearly one-third of the production. But in its tabulation of imports the government includes under 'crude phosphates' phosphate rock, superphosphate and other phosphatic materials. The actual imports of phosphate rock amount to 8,000 or 10,000 tons annually, principally from the West Indies, while the bulk of the crude phosphates reported by the government is superphospate, chiefly from Belgium. It would avoid some confusion if the reports gave the more important phosphatic materials separately, since the import trade is attracting attention.

Celestite.—I have a large deposit of celestite, and would like to know something about its uses, and the parties who are in the market for it.—A. S. O.

Answer.—Celestite, or sulphate of strontium, is used in the preparation of nitrate of strontia, which is employed in fireworks; also in the preparation of other strontium salts. The principal use of the latter is for refining beet sugar. Some strontium salts are utilized in medicine, but the quantity is very small. The principal dealers in this material are the Roessler & Hasslacher Chemical Company, 100 William St., New York, and E. de Haen, Seelze, near Hanover, Germany.

Sodium Cyanide.—Please inform me whether any modern cyanide plants are using sodium cyanide, instead of potassium cyanide successfully? Has it proved more successful with potassium cyanide? How does it compare in price in large lots with potassium cyanide?—F. W. B.

Answer.—This question was published in the JOURNAL for April 21 last. As we were unable at the time to answer the inquiry fully, we take pleasure in giving further details which have recently come to hand.

Sodium cyanide is now being manufactured and supplied to the trade in large quantities by the Scottish Cyanide Company, Ltd., whose works are at Leven, in Fifeshire, Scotland. The process employed in its production involves the manufacture of barium cyanide by electrical means and the conversion of this into sodium cyanide by a wet chemical method. The cyanide is obtained in the form of white flakes, which are compressed into bricks before marketing. It is claimed that this form of cyanide possesses many advantages over the ordinary potassium cyanide (a mixture of sodium and potassium cyanide) including higher strength, greater solubility and freedom from alkaline sulphides. Its superiority as regards strength is evident from the fact that it contains a larger proportion of cyanogen; pure potassium cyanide is made up of 60 per cent potassium and 40 per cent cyanogen and pure sodium cyanide of 46.9 per cent sodium and 53.1 per cent cyanogen. Stated in terms of the old standard, 98 per cent pure, the sodium cyanide, therefore, has a strength of from 120 to 125 per cent. Experiments to determine the relative solvent powers of the two compounds show that sodium cyanide is superior in this respect also, probably owing to its freedom from objectionable impurities, especially alkaline sulphides.

ACCEPTANCE OF OPTION MAKES TRANSACTION ABSOLUTE SALE.—Where one gives another an option to purchase a tract of coal, and extended it to a date mentioned, and within the time named the option was accepted, the transaction became an absolute sale, and failure to pay the price on the date mentioned for the expiration of the option did not revoke the contract.—Pennsylvania Mining Company v. Smith (56 *Atlantic Reporter*, 426); Supreme Court of Pennsylvania.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

COMPLAINT MUST BE SUSTAINED BY PROOF.—Proof that a party injured in a mine proceeded to the shaft to give an order, not by reason of any direction from the superintendent, will not sustain a recovery on a declaration alleging that the superintendent gave him orders to do what he did.—Cardiff Coal Company v. Waybright (108 *Appellate Court Reports*, 561); Appellate Court of Illinois.

DISCRIMINATION IN FURNISHING CARS TO COAL MINES.—In this case, the refusal of the railroad company to furnish cars to complainants between February 25 and March 26 on the Deal side-track at Meyersdale and the side-track of the Savage Fire Brick Company at Keystone Junction, while furnishing and offering to furnish cars to complainants' competitors at other points, under the circumstances disclosed by the evidence, was undue and unlawful discrimination against complainants, for which they are entitled to reparation. Making certain charges for the transportation of coal shipped in carloads when the coal is loaded by tipple, and exacting a higher charge when it is loaded in some other way, and for that reason is not justified by difference in cost to the carrier between different methods of loading, or by other facts appearing in this case, and renders the higher rates thus made unreasonable and unduly discriminatory, first, as against complainants, and, second, as against all other shippers of coal except those who load by tipple, and constitute a violation of sections 1 and 3 of the Act to regulate commerce.—Complaint of Glade Coal Company against Baltimore & Ohio Railroad Company; Interstate Commerce Commission.

SURVEYING-BOUNDARIES OF MINING CLAIMS. The following is the text of an act passed by Congress just before its recent adjournment:

"Be it enacted, That section 2,327 of the Revised Statutes of the United States be and the same is hereby, amended to read as follows:

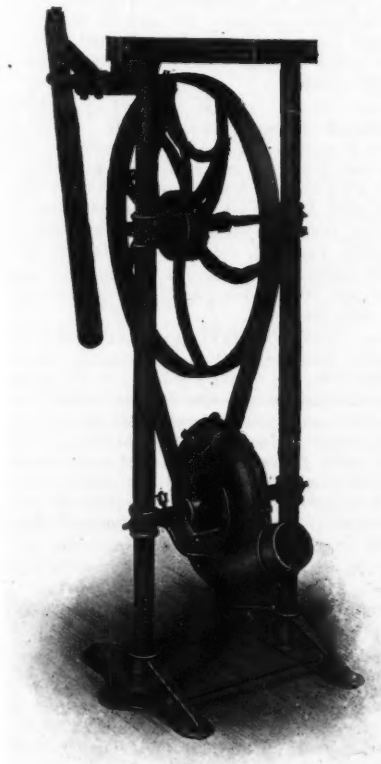
"Sec. 2327. The description of vein or lode claims upon surveyed lands shall designate the location of the claims with reference to the lines of the public survey, but need not conform therewith; but where patents have been or shall be issued for claims upon unsurveyed lands, the surveyor-general, in extending the public survey, shall adjust the same to the boundaries of said patented claims so as in no case to interfere with or change the true location of such claims as they are officially established upon the ground. Where patents have issued for mineral lands, those lands only shall be segregated and shall be deemed to be patented which are bounded by the lines actually marked, defined, and established upon the ground by the monuments of the official survey upon which the patent grant is based, and surveyors-general in executing subsequent patent surveys whether upon surveyed or unsurveyed lands, shall be governed accordingly. The said monuments shall at all times constitute the highest authority as to what land is patented, and in case of any conflict between the said monuments of such patented claims and the descriptions of said claims in the patents issued therefor the monuments on the grounds shall govern, and erroneous or inconsistent descriptions or calls in the patent descriptions shall give way thereto."

DIAMOND MINING IN BRAZIL.

One of the many districts of Brazil in which diamonds are found is known as Diamantina, about 900 kilometers north of Rio Janeiro, in the state of Minas Geraes. From a recent paper by Mr. L. Cugnin, in the *Bulletin* de la Société de L'Industrie Minerale, we learn that the natives still employ the method which has prevailed in the country from of old. It consists in cleaning the placer gravel with a stream of water and then completing the washing in the *baco*. The *baco* is made of a square compartment of which one side is open and of which the bottom, made of beaten earth, is gently inclined toward the base. It is placed on the edge of a river bank or on one of the sides of a pond, the level of which is a little below that of the *baco*. The washer stands in the water and by the aid of a *batea* raises a certain quantity of water which he throws over the gravel placed in the bottom of the *baco*. Thus an almost perfect cleaning is produced, and the concentration of the gravel is effected by the elimination of the fine sand, which is carried away by the water, while the large stones remaining on the top of the heap are removed by hand. The material thus concentrated is forthwith treated by the *batea*, leaving only the heaviest minerals, which are picked over carefully by hand.

A NEW HAND-BLOWER.

The accompanying illustration shows a new type of hand-blower made by the B. F. Sturtevant Company, of Boston. The details are the result of long experience with machines of this



A NEW HAND BLOWER.

class. These hand-blowers have been extensively introduced in connection wth new forges of all kinds and have likewise been applied to old style brick and iron forges as simple, efficient and economical substitutes for the bellows. Not only are they adapted to forge blowing, but can readily be applied as portable ventilating apparatus. They are simple in design, strong, rigid and compact, easy and economical in operation and readily portable. The running gear is simple, effective and strong.

The blower is adjustable on the shaft, and its outlet may thus be set to discharge in any direction and readily connected to the forge tuyere by means of galvanized iron piping. The blower is of cast iron, strongly constructed in every particular, has a steel shaft running in babbitted boxes and a fan wheel of galvanized steel solidly riveted to a composition hub with extending arms. The frame is carefully designed, well braced, and is so arranged that the slackness of the belt driving the blower may be taken up by lowering the blower shaft, which is supported by collars sliding on the frame. The feet are provided with holes so that the hand-blower may be readily screwed to the floor.

These hand-blowers are made in two sizes. The total length on the floor of style B-1 is 18 in., while the total height of the frame not including the handle is 48 in. The driving wheel is 24 in. in diameter, the blower outlet is 3.5 in. in diameter and the complete outfit weighs but 135 lb. Style B-2 is of slightly larger dimensions and has proportionately greater capacity for delivering air. The driving wheel is 24 in. in diameter, the blower outlet is 4.75 in. in diameter and the outfit weighs 155 lb. complete.

PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNA. upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared.

Week Ending May 24, 1904.

760,448. MACHINE FOR ROLLING HELICOIDS OR SPIRAL CONVEYERS.—Charles O. Gustavsen, Chicago, Ill. The combination with a forming-roll having substantially conical surfaces, of a cone adapted to coact at times with each of a pair of said surfaces to engage the stock and form a helicoid.

760,456. STEAM-SHOVEL.—Geo. W. King, Harry J. Barnhart and Charles B. King, Marion, Ohio, assignors to the Marion Steam Shovel Company, Marion, Ohio. In a steam-shovel, the combination, with a body or support, of a hoisting-drum and separated engines therefor located thereon, swinging-engines located between the hoisting-engines, and a swinging-drum supported on the hoisting-engine frames.

760,468. CONVEYER.—Thomas S. Miller, South Orange, N. J. The combination with a trackway and a hoisting-rope, of a carriage upon said trackway provided with a guide for the hoist-rope, a load-operated brake upon said carriage, and a spring acting when unrestrained to free said brake.

760,474. PULVERIZING-MACHINE. — Frank C. Nickel, Detroit, Mich. In a pulverizer, the combination of a suitable case, an opening therein for the reception of the material, said case having a cylindrical concave of grinding stone, a rotary grinder and pulverizer in the case having opposed radial arms, a first and a second brake for the material interposed between the ingress opening and said rotary pulverizer, knives carried upon the opposed radial arms of the rotary pulverizer.

760,479. CONVEYER.—William J. Patterson, Pittsburg, Pa., assignor to Heyl and Patterson, Pittsburg, Pa. In hoisting apparatus, the combination with a frame, of an elevator-leg suspended therefrom and comprising telescoping members, an endless conveyer extending downwardly into said elevator and having a downwardly hanging loop, and mechanism operatively connected to the lower member of the telescoping leg for raising and lowering the same.

760,495. FURNACE FOR MELTING METALS.—James Southern, Belleville, N. J.; John J. Connell, administrator of said James Southern, deceased, assignor of one-half to Walter H. Steinbrecher, New York, N. Y. A melting-furnace having a wall, a melting-chamber beyond said wall, a plurality of combustion-chambers formed in said wall and branching at their ends next the melting-chamber to provide an increased number of discharge-openings to discharge heat into the melting-chamber, and means for supplying heat.

760,510. ROASTING-FURNACE.—Lewis T. Wright, Keswick, Cal. The combination, with a floor, of a central hollow shaft, a hollow arm communicating therewith and carried thereby over the floor, a pipe in said hollow shaft, a conduit connected with said pipe and discharging into said hollow arm, a feed-pipe leading upward to, and connected with, the bottom of said inner pipe and a discharge-pipe connected with the top of said hollow shaft.

760,523. METAL-CASTING MACHINE. — Ernest Crossley, Canton, Ohio, assignor to the Aultman Company, Canton, Ohio. In a pig-casting mechanism, the combination of the mold-carrier, a series of molds rotatively mounted on the carrier on axes substantially radial to the axis of rotation of the carrier, the two-part holding device to prevent rotation of the mold on its axis, one part consisting of a stationary bar held independently of the molds and mold-carrier, and the other part carried by the mold and engaging with the stationary part.

760,524. CONVEYER.—Ernest Crossley, Canton, Ohio, assignor to the Aultman Company, Canton, Ohio. In a conveying apparatus the combination of a driving device moving in relatively fixed lines, a series of carrier-sections movable bodily vertically from one set of lines of travel to another set of lines relatively to the driving device, and propelling devices interposed between the driver and the carrier-sections.

760,539. PROCESS OF RECOVERING METALS FROM ORES OR SANDS.—William J. Jory and Joseph H. Jory, San Francisco, Cal. A process comprising simultaneous pulverization of the ores and treatment with reagents adapted to combine with less valuable constituents of the ores to form a solvent for the noble metals.

760,551. CONTINUOUS MUFFLE-KILN.—Thomas S. Nickerson, Newburyport, Mass. A kiln of the character specified comprising a heating-chamber having a track, a furnace for continuously heating said chamber to a predetermined high temperature, a chamber elongated from front to rear and adapted to receive the articles to be initially heated, a cooling-chamber elongated from front to rear, each of said last-mentioned chambers having an independent furnace.

760,554. MANUFACTURE OF SULPHIDE OF ALUMINUM AND ALLOYS OF ALUMINUM.—Miyagoro Onda, Nagoya, Japan. A process of manufacturing sulphide of aluminum, together with an alloy of aluminum and other metal or metals contained in the metallic sulphide used in the process, in one operation, which consists in subjecting a compound consisting of oxide of aluminum or other ores containing it, together with carbonaceous materials and a metallic sulphide to a high temperature in a suitable furnace.

760,561. PROCESS OF MANUFACTURING HARD POROUS ELECTRODES FOR BATTERIES.—Heinrich P. R. L. Pörscke and Gustav A. Wedekind, Hamburg, Germany. A process for treating metallic oxide or metallic powders of the character set forth, for the manufacture of hard porous electrodes which do not dissolve in alkaline solutions, which consists in stirring the metallic oxide or the metallic powders, without the addition of foreign substances, to a pasty mass in a solution of the chloride of the metal used, then putting the paste into molds or on carriers and heating until dry, then reducing the electrode to a metal in an alkaline solution.

760,563. PROCESS OF EVAPORATING ALKALINE SILICATE SOLUTIONS.—Carl Reim, Odessa, Russia. A herein-described method of producing silicate of alkali in a solid but moist condition in which it is easily soluble in water consisting in dividing up the solution of silicate of alkali in the form of drops, jets or the like gathering said drops upon a moving evaporating-mantle and removing the said silicate of alkali at the moment it changes from a liquid to a solid form.

760,571. PROCESS OF PRODUCING REFRACTORY CALCAREOUS SANDSTONES.—Wilhelm Schwarz, Zurich, Switzerland, assignor, by mesne assignments, to Schwarz System Brick Company. A process which consists in first heating granulated quartz nearly to its melting-point, combining the same with lime, and then forming the combined lime and quartz into suitable shapes.

760,575. MINING-MACHINE.—Frank L. Sessions and George B. Norris, Columbus, Ohio, assignors to Joseph A. Jeffrey, Columbus. In a mining-machine, the combination with the carriage, the bed, and the cutter-carrying chain mounted upon the carriage, of the lubricant-receptacle, the valve, controlling the flow of oil therefrom, means for guiding the oil to the chain, and automatically-actuated tripping devices for intermittingly opening the valve as the carriage moves along the bed to permit a limited flow of oil.

760,582. TONGS FOR FURNACE-CHARGING CRANES.—Clarence L. Taylor, Alliance, Ohio, assignor to the Morgan Engineering Company, Alliance, Ohio. The combination with tongs-carrying frame, of tongs each having a bit at its free end to engage the slab or ingot and an inwardly-projecting shoulder or abutment in rear of its bit, and means for actuating the tongs.

760,593. MINING-PICK.—George T. White, Colfax, Iowa. In a mining-pick, the combination of a pick-head provided with a downwardly-extending T-shaped shank secured centrally to its under surface, with a spring and set-screw to hold the head to the handle.

760,597. CAR-LOADING MECHANISM.—Freeman R. Willson, Jr., Worthington, Ohio, assignor to Joseph A. Jeffrey, Columbus, Ohio. The combination with a reciprocating chute of the telescoping chute having its bottom and sides inclosing the bottom and sides of said reciprocating chute, the supporting devices for said telescoping chute and the lock adapted to rigidly connect said chutes together.

760,600. APPARATUS FOR WELDING IRON AND STEEL.—Abram C. Allen, Dayton, Ohio, assignor to Eugene Kennedy, Montgomery County, Ohio. A welding-furnace having a heating-hearth for heating materials to be welded, and an anvil within said furnace adjacent to the heating-hearth, whereby the materials to be welded may be heated upon said hearth in said furnace and welded upon the anvil without removing any of the parts from the furnace.

760,633. METHOD OF AVOIDING LOSS OF HEAT IN FURNACES.—Adalbert Kurzwernhart, Zuckmantel, near Teplitz, Austria-Hungary. A method of avoiding loss of gas in Siemens regenerative furnaces wherein, before the reversing operation, the gas contained in the regenerative chamber and in the passages connected therewith is forced into the furnace by air which, after the gas has been cut off in a known manner, is introduced through a lateral opening.

760,638. GAS-GENERATOR.—William F. Mattes, Scranton, Pa. In a gas producer or generator, the combination of a fuel receptacle or hopper, a plurality of vertical flues, tubes, or passages arranged to receive fuel from said hopper, means for controlling the rate of feeding fuel from said hopper into said fuel-flues, a combustion-chamber into which the lower ends of said fuel-flues deliver, and uptake flues or passages leading from said combustion-chamber and alternating with said fuel-flues.

760,651. APPARATUS FOR THE MANUFACTURE OF ARTIFICIAL STONE. — Wilhelm Schwarz, Zurich, Switzerland, assignor, by mesne assignments, to Schwarz System Brick Company. In a combined drying and mixing apparatus for the manufacture of artificial stone, a stationary main tank, a rotatable shaft therein, having mixing-blades, mechanism for rotating said shaft, a heating-jacket partly surrounding said vacuum-tank, and proper discharge openings.

760,664. GOLD-WASHING MACHINE. — Christian C. van der Valk, Voorburg, near The Hague, Netherlands. A gold-washing machine comprising a receptacle the bottom of which runs downwardly toward the center, a non-rotating support for said receptacle, said support being provided with a recess, and said receptacle having an opening communicating with said recess and means for simultaneously giving said receptacle a constantly-changing inclination and an up-and-down motion, whereby the specifically heavier bodies contained in the charge in the receptacle are caused to advance toward said recess.

760,674. GAS-PURIFIER.—Paul Winand, Charkow, Russia. In a purifier the combination of a series of substantially horizontally disposed plates arranged one above the other in the path and direction of passage of the gas or liquid to be purified and adapted to subdivide the current of said gas or liquid into a series of flat shallow streams or currents without deflecting the course of the body of the fluid.

760,682. TUBE-SUPPORT FOR OIL-WELLS. — Charles Card, Sackett, Pa. A device comprising a tube having a vertical, longitudinal shoulder at its upper end, a horizontal annular shoulder below the vertical shoulder, and threaded adjacent its lower end.

760,691. PROSPECTOR'S PAN.—Beverley P. Herndon, Florence, Arizona. A portable pan for prospectors, having a bottom and side walls, said side walls being curved transversely or laterally in relation to the bottom and the pan being of substantial lune shape in general contour.

760,702. AUTOMATIC TRIPPER FOR CONVEYER-BELTS.—John J. Ridgway, Rosebank, N. Y. The combination in a deliverer for conveyers, of a conveyer-belt, idler-pulleys and their supporting-shafts driven by said belt, driving-wheels for giving travel to the deliverer, driving means normally free on the idler-shafts and connected with said driving-wheels, clutching means for holding the driving means in operative relation with the idler-shafts, a tripping device, and means controlled by the tripping device for causing the clutching means to alternately place the driving means in operative relation with the driving-wheels.

760,763. PULVERIZING-MACHINE.—August Schoellhorn and Herman S. Albrecht, St. Louis, Mo. The combination of the housing, a grate arranged in the lower half thereof and a rotary beater arranged above the grate.

760,783. FLUX FOR SOLDERING ALUMINUM.—Carleton Ellis, Boston, Mass., assignor to Nathaniel L. Foster, trustee, Brookline, Mass. Flux for soldering aluminum consisting of a heavy metal salt whose heat of formation is less than the corresponding salt of aluminum, a saline body whose heat of formation is greater than the corresponding salt of aluminum and an organic body.

760,803. MOLD FOR CONSTRUCTION OF SOLID BRICK OR STONE.—John P. Oosting, Holland, Mich. A mold comprising a base, a bottom plate supported thereby, swinging sides detachably connected to the base and end pieces hinged to the detachable sides.

760,821. KILN.—William Sutton, Table Rock, Neb. —A kiln comprising a stack, burning chambers or compartments arranged in a series around the stack and having flue means connecting the same.

760,825. ANNEALING APPARATUS.—Edward A. Uehling, Passaic, N. J. The combination of a car adapted to convey annealed material, said car being provided with a fireproof floor, an open metal box erected upon said floor, means for dividing a part of the interior of said box into rectangular portions, means for filling said portions with molten material to be annealed, means for substantially covering said rectangular portions with an envelop of the said molten material, and means for discharging the contents of said car.

760,843. ELASTIC-FLUID COMPRESSOR.—Henry Bland, Waverley, New South Wales, Australia. The combination with a cylinder and cylinder-head, of a hollow plunger fixed to the cylinder-head and disposed centrally in the cylinder, a trunk-piston arranged to reciprocate in the cylinder for compressing the fluid, a barrel movable with the trunk-piston and inclosing the hollow plunger, said hollow plunger being provided with spraying-perforations adjacent to the cylinder-head, and means for introducing water into said barrel behind the plunger.

760,852. MANUFACTURE OF NICKEL CARBONYL.—James Dewar, Cambridge, England. A process for the manufacture of nickel carbonyl consisting in passing carbonic oxide over heated metallic nickel under a pressure between 2 atmospheres and 100 atmospheres.

760,858. ROLLING-MILL. — Victor E. Edwards, Worcester, Mass., assignor to Morgan Construction Company, Worcester, Mass. The combination with a series of pairs of rolls for the continued reduction of a rod and arranged in horizontal alinement, of a series of carved repeaters connecting the successive pairs of rolls and arranged in a series of concentric curves of increasing radius as the reduction of the rod progresses.

760,873. HOT-BLAST VALVE.—Julian Kennedy, Pittsburg, Pa. A hot-blast-valve casing formed in two sections with clamping-rings at their adjacent ends, a valve-seat between the rings, and clamps arranged to draw the rings together and having thereon means for forcing the rings and casing-sections apart to release the valve-seat.

760,888. CEMENT-BRICK MACHINE.—John D. Luttrell and William C. Cantrell, Lake Station, Ind. The combination of a block supported to move horizontally, a mold-box supported by bars to move vertically on the block, means for moving said bars vertically, means for moving the block and the mold-box horizontally to disengage the latter from its supporting-bars, and means for supporting the box in the same plane when so disengaged.

760,903. MECHANISM FOR RAISING LIQUIDS FROM DEEP WELLS.—Thomas F. Moran, De Young, and Fred J. Moser, Kane, Pa. The combination of a casing provided with tubing for carrying liquids to the surface of the earth, an air-pipe disposed within said tubing, an air-nozzle connected with said air-pipe, and a valve controlling communication between said air-pipe and said air-nozzle.

760,934. APPARATUS FOR COALING BOATS.—Henry D. Stearns, New Orleans, La. Apparatus consisting of the combination with a coal-barge divided into separate bins, of a conveyer extending down into the barge and under the said bins, a weighing-machine on the barge, located adapted for receiving the elevated coal, a second conveyer arranged for conveying coal from the weighing-machine, to an elevated position, a chute into which the weighed and elevated coal is delivered.

760,941. ORE-TREATING FURNACE.—Christopher C. Wilson, Denver, Colo. In an ore-roasting furnace, a revoluble ore-roasting chamber, and longitudinal shelves projecting from the walls of said chamber, said shelves constructed to cause the ore to drop from shelf to shelf and to move inwardly and outwardly on the popposite side of each shelf.

760,997. APPARATUS FOR MANUFACTURING CYANIDES.—James A. Kendall, Streatham, London, England, assignor of one-half to Joseph Wilson Swan, Holland Park, London, England. An apparatus for making cyanide consisting of an inner vessel of nickel, with a continuation both surrounded by a jacket, an external tube fused to the said continuation the joint being so situated as to be protected by hydrogen in, or passing from, the jacket-space, and means for applying heat, and also means for supplying hydrogen to the jacket-space, and means for supplying the agents which take part in the reaction.

761,034; 761,035; 761,036 and 761,037. CHAIN.—James M. Dodge, Philadelphia, Pa. The combination in a chain, of two links, a pivot-pin coupling the two links, two segmental bushings bearing upon the pivot-pin, one bushing attached to one link and the other bushing attached to the other link.

761,049. ORE-ROASTING FURNACE.—William H. Smyth, Berkeley, Cal. A slotted-hearth furnace with rabble-actuating devices projecting through the slot and laterally-swinging plates or gates adapted to close the slot.

761,050. ORE-ROASTING FURNACE.—William H. Smyth, Berkeley, Cal. An ore-roasting furnace of brick or the like having a plurality of slotted hearths placed longitudinally side by side, rabbles adapted to travel above said hearths to stir the ore thereon and means projecting through the slots to support and effect the travel of the rabbles and means for transferring the rabble-supporting devices from one slot to another and means independent of the brick structure to maintain the alignment of the slots with the rabble-supporting means.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week Ending May 7, 1904.

12,773 of 1903. BISMUTH COMPOUND.—Kalle & Company, Biebrich, Germany. Method and process for producing a colloidal compound of bismuth oxide suitable for medicinal purposes.

28,805 of 1903. ELECTRIC FURNACE.—C. P. E. Schneider, Cruesot, France. Improvements in electrical furnaces where the current is induced in the charge by the influence of an external alternating current field.

3,014 of 1904. MINE CAGE SAFETY STOP.—S. Henrard, Liege, Belgium. Safety appliance for gradually arresting the mine cage when the rope breaks so that the safety apparatus shall not have to withstand such sudden shock.

SPECIAL CORRESPONDENCE.

Denver. May 28.

(From Our Special Correspondent.)

During the week the twelfth annual convention of the Western Federation of Miners was held in this city, with about 250 delegates present. President Moyer was absent, being detained a military prisoner at Telluride. As the constitution of the Federation contains a clause that no man shall be elected president unless he is present at the time the vote is taken, there is a probability of another executive officer being elected.

The American Smelting & Refining Co., it is understood, will within a few days divide $100,000 among its employees in accordance with a resolution adopted some time ago.

It is rumored that a deal is about completed for the sale of the Stratton Estate properties in the Cripple creek district, embracing about 700 acres of valuable land, and to a great extent unexplored territory, to a syndicate. It is a fact that the property is on the market. With systematic development a sale would probably lead to the opening of several valuable mines and be a splendid thing for the district, as a large force of miners would be employed.

The official call of the seventh annual session of the American Mining Congress has been issued, the same to be held at Portland, Ore., on August 22. Two of the most important subjects to be considered will be the relation of mining to the industrial development of the United States and the creation of a department of mines and mining by the United States Government. For several years Mr. Irvin Mahon has been secretary of the Congress, but he has announced that he declines to be a candidate for re-election.

There is nothing new in the strike situation at Telluride and Trinidad, both districts still remaining under martial law. At the latter place 10 men were deported a couple of days ago and taken across the New Mexico line.

The property of the Union Ore Extraction & Reduction Co., which was operating a small plant in this city, was sold by the sheriff this week under a judgment in favor of the International Trust Co. and bought in by R. W. McCaffrey, H. D. Ingersoll and W. G. Maitland, acting for the bond holders.

The Moffat Line management is expecting to run trains to Rollinsville about June 10.

An important case involving apex rights and a large sum of money representing the value of ore taken from the disputed ground between the Londonderry Gold Mining Co. and the United Gold Mines Co. in the Cripple creek district, has just been won by the latter in the District Court. Notice of appeal to the Supreme Court was given by the plaintiffs.

Duluth. May 30.

(From Our Special Correspondent.)

The Duluth, Missabe & Northern road began hauling ore last year on March 26, and all the roads got in a full month in April. The present season is, therefore, two months behind already. Though the Lake Carriers' Association is saying something about starting ships without the masters of the union, not much is actually under way, and there is litte hope of very much of a break into the ranks of the masters. Ore men begin to be quite restive. More and more mines close on the various ranges, and less and less miners are able to get work. Men are leaving many of the mining fields in large numbers for the West and Southwest, and if a fair business should spring up it would be difficult to get men to carry on the work.

A notable cargo of ore was shipped from Duluth on Saturday on the English-built Welland canal ship, Turret Cape, being 1,704 tons of Albany grade, consigned to the Dominion Iron & Steel Co. at Sydney, Cape Breton. This is the first cargo ever sent to that part of the coast, and the first interior ore that the Dominion company has found it necessary to use with its own grades. A considerable quantity of this western Mesabi ore will be shipped to Sydney this year. Albany grade is guaranteed to carry 60% iron and .077 phosphorous.

The county boards of Marquette county, Mich., have begun an investigation as to the various Mesabi range companies owned by J. J. Hill and the Great Northern road. These are the Lake Superior Co., Swan River Logging Co., West Missabe Land Co., Wright Land Co., Wells Land Co., Stone Land Co., Western Employees Investment Co. and Davis Land Co. Most of these are companies growing out of the purchase, some years ago, of the Mesabi interests of Messrs. Wright, Wells, Stone and Davis, of Saginaw, on the western Mesabi, chiefly in T. 57 R. 21, by the Great Northern road. With the exception of a little land near Hibbing, these companies own nearly all the ore-bearing formation through that township. The Western Employees Investment Co. is an organization formed by Mr. Hill for the benefit of some of his assistants who had most to do with the development of his business on the Mesabi range, and to which he turned over an extremely valuable mining lease. These concerns are all limited partnerships, and all have had their head offices at Marquette, in Michigan, for a year, though their entire business is carried on at St. Paul and Duluth, in Minnesota. The Marquette officials seem determined to place them on the tax rolls.

Pickands, Mather & Co.'s Troy mine, at Eveleth, is to be closed indefinitely, and the pumps are being pulled. The mine is developed for a large production and has been stocking ore since last fall. It has made total shipments of only 15,000 tons. The company is shipping its Albany grade ore from its Utica mine, as Albany is not in shape for shipment yet.

It is figured that stockpiles at Eveleth, where the Fayal, Spruce and Cloquet mines are located, amount to more than 1,600,000 tons. The companies are unable to mine much more and are working as slowly as possible. The railroads have filled sidings about the mines with ore cars, waiting for the movement of vessels, and the work of repairing machinery is under way.

Ore loading at the Mahoning mine, which began a few days ago, has been stopped and the single shovel then in use is laid up.

The Oliver Iron Mining Co. is again mining at its Savoy mine at Ely, after a shut-down of two weeks. A small force will be employed until navigation opens. At the other mines nothing is under way at present except the loading of ore from Pioneer stockpile, this ore being some that had to be gotten out of the way at once.

San Francisco. May 25.

(From Our Special Correspondent.)

The River Convention held a two day's session and adjourned, without any friction between the anti-debris men and the miners, and without mention being made of the mining dredge question. The valley people, finding that the dredge men had organized at Oroville and that the California Miner's Association had offered to take a hand in any contest on the floor of the convention, said nothing and the convention appointed an executive committee to handle the question of river improvement, with power to employ five engineers, three to be nonresidents of the State, a State engineer and a Federal engineer, these to formulate some plan to prevent the low lands being flooded every rainy season. The problem is entirely an engineering one and was so considered, though the delegates talked of State and Federal assistance, etc.

It is evident that a fight is going to be made against dredge mining by the Anti-Debris Association, and if it pursues the same tactics it did with the hydraulic miners, some of the dredges may be tied up by injunction. Only those dredgers working in the beds of running streams are apt to be troubled, since those working inland away from the rivers can not in any possible way be charged with doing damage.

As an indication of what may be expected it may be stated that after the committee of the Miner's Association visited Oroville to see the dredger situation, a committee of the Anti-Debris Association did the same. As a good many dredger men had come to San Francisco to attend the convention, the anti-debris people saw only a few of the dredges at work: one only in the main river or one of its channels or sloughs, below Oroville. They at once concluded that all the damage done by the floods of this spring in that locality was due entirely to the dredging operations and told the newspapers so. The river overflowed its banks seven times during the winter and spring, and, as usual during such freshets, considerable silt and sand were washed down. In some places lands down the river were covered several feet deep. That the few dredgers in the river could do this is of course unreasonable, yet the Anti-Debris Committee at once decided that all this damage was done by dredgers and that the dredge operations were a menace to the valley lands, causing the same results as hydraulic mining, except in less degree. This committee will so report to the association, so that we may expect at any time to see injunctions brought to stop dredge mining in the rivers. The dredge men have no special fear of the result of an official investigation, but do fear the delays caused by injunction and also the probable decisions of courts in anti-debris counties. If they can get their cases into United States courts, as some of the "foreign" corporations can, they feel safe. The Yuba, Feather and American rivers all have dredges at work, and it is upon these rivers that the impending contest will be fought out.

Eventually the matter will doubtless be settled so that no interference can be made with the dredges. The amount of silt in the river above and below the operating machines must be measured both at high and low stages of the rivers, and it will then be seen how little of the stuff handled passes any distance down stream. The material handled is nearly all heavy, as it is the concentrated remains of the erosion and wash, the lighter stuff having passed down to the flat lands below.

The board of supervisors of the city and county of San Francisco is about to take a step of great importance to the oil and asphalt men of the State. The so-called asphalt streets of the city have been paved for years with a natural bituminous rock, brought mainly from the counties of Santa Cruz and San Luis Obispo. This is a sand "rock" cemented by bitumen and quarried in a natural state ready to be applied to the streets on being warmed. It makes an excellent pavement when properly laid, and is delivered in this city for about $5 per ton. There is now a move to do away entirely with the use of this bituminous rock and use in its place the pure asphalt obtained as a residue in the refining of California crude petroleum. Numbers of refineries are turning out this product which may be produced more cheaply than by actual mining of asphalt rock. The supervisors have determined to ask the Board of Public Works to require this commercial asphalt in future paving contracts.

A new company, capitalized at $21,000,000, called the Pacific Coast Coal Co., has been organized in San Diego as part of the steel plant and railroad combine of Messrs. French & Purman. They have under bond some 20,000 acres of coal lands at Controller Bay, Alaska, 7,500 acres on Vancouver Island, and have just concluded a deal for the coal mines at Garlock, Kern county, which have "been going to be opened" for some years. The company which was to utilize this Kern coal at the mines to generate electricity to be conveyed away for power purposes, seems to have fallen by the wayside after having bought wires, dynamos, etc., which were never used. These are the old Mammoth coal claims. The coal is like most of the California coal of an inferior quality and under present conditions will have to be hauled some 35 or 40 miles to the railroad at Mohave.

The interests of the Butte and Plumas railroads (at present on paper) have been merged with the Western Pacific. These roads will now form part of a new transcontinental road coming into California through the Beckwith Pass, Plumas county. The Alameda & San Joaquin railroad, leading to the Tesla coal mines in Alameda county will be a portion of this road and has already acquired right of way into and through Oakland on the shores of San Francisco bay. Rights of way for the Western Pacific have been asked in Oroville. This rather ends the mystery of the extensive purchases of land along the north fort of Feather river and thereabouts in Butte

and Plumas counties made by H. H. Yard. The line as projected will run through a rich gold and copper belt in the high mountain country of Plumas county and bring them to a profitable stage.

A suit asking for partition and a receiver in the matter of the Socrates quicksilver mines, Sonoma county, has been filed and all the questions raised will now go to the Superior Court of Sonoma county. There are 52 defendants named in the complaint.

Geo. W. Rumble, mine promoter, manager, secretary and everything else of the Sunset Mining Co., supposed to own the Old Glory, Amo and other mines in Butte county, has been convicted in the United States district court for using the mails with intent to defraud. This man, by means of glowing circulars, induced numbers of people in the eastern States to invest their money in the Sunset on promise of two per cent per month dividends. He stated that the mines had paid dividends consecutively since 1894. It was found that there never was a dividend declared and that no meeting of the directors had ever been held. All the moneys received had been put in the banks in Rumble's name or that of his wife and none was deposited in behalf of the company. All the dividends were paid out of money derived from sales of treasury stock. Rumble represented the value of the Old Glory mine at $500,000 when testimony showed it was worth about $6,000. The Amo was worth nothing whatever, and had only been worked at a loss. In fact his company never at any time derived any net profit from its mines. He had the company capitalized at $10,000,000, never kept any books and never had any meetings of the board of directors, banking proceeds in his own name. State mineralogist Aubury exposed Rumble, and Rumble flooded the country with circulars against Aubury, saying he was trying to get the valuable Sunset property. He even suggested that the governor of the State was in with Aubury on this scheme. The jury found him guilty in less than an hour's deliberation. Sentence has not yet been passed but will be this week. The limit of punishment is only 18 months imprisonment and $500 fine. And this after this man has taken hundreds of thousands of dollars from unsuspecting victims. However, the Government can now intercept his letters and further swindling on the same line will be prevented.

Toronto. May 27.

(From Our Special Correspondent.)

There is great activity this season in mineral and geological research by the Ontario Bureau of Mines. Dr. J. McIntosh Bell has gone to the Michipicoten mining district to complete his examination of the Michipicoten iron range. He covered a portion of this important field during previous seasons, and when his researches are completed will present the result in a monograph to be published by the Bureau. The Helen mine has produced to date 850,000 tons of ore. A number of other deposits have already been fairly explored by diamond drill. There are, however, other showings of iron.

Prof. W. G. Miller, provincial geologist, has gone to explore the recent discoveries of cobalt, nickel, arsenides and silver ores in the Temiskaming district and will afterwards investigate a number of reported finds of various minerals north of Lake Temiskaming and continue defining the iron ores in the neighborhood of Lake Temagami.

J. A. Macmillan left Toronto on May 25 in charge of a party to explore a large area west of Lake Abitibi, about 180 miles north of North bay, on the Hudson bay slope north of the Height of Land. Mr. Macmillan will examine the geological features of the district with a view of ascertaining whether it contains any valuable mineral deposits.

The owners of the Big Dan mispickel property on Net lake near Lake Temagami have just had the property examined by a New York mining expert with the view of carrying on extensive explorations this summer. The opening up of the country by the construction of the Temiskaming and Northern Ontario railway renders its development practicable.

The Dominion government regulations respecting placer mining in Yukon Territory have been amended so as to provide that in case of the death or insanity of any miner the provisions as to abandonment of mining claims shall not apply. In such case the commissioner of the Territory may either cause the property to be worked in the usual manner or may cause the working to be dispensed with for such periods as the necessity of the case may demand. The commissioner may also, if he sees fit, cause the public administrator to take possession of such property until it is administered under the provisions of any ordinance respecting the administration of the estates of deceased or insane persons, or until it is taken possession of by any one entitled to do so under letters of administration granted by the proper court.

Dr. A. P. Coleman will, this season, continue his examination of the nickel areas of Ontario, for the Provincial Bureau of Mines. He will be assisted by M. T. Culbert, of the Toronto School of Practical Science, and by R. S. Moore, of Toronto University.

The governors of the Kingston School of Mining have elected Hon. Wm. Harty, M. P., president, and W. Bruce Carruthers, vice-president. Mr. Stafford Kirpatrick was permanently appointed professor of mineralogy and Mr. Gwillim, professor of mining engineering.

The British American Development Co., Ltd., has obtained a provincial charter of incorporation to carry on mining, milling, reduction and development. The capital is $1,000,000 and the head office at Toronto. The provisional directors are James E. Haines, Brampton; Alfred T. Haines, Cheltenham; Adam Linton, James E. Carter and Wm. J. Armstrong, Guelph; John W. Cheeseworth, Toronto.

The Burley Gold Mining Co., of Ottawa, has surrendered its charter. The mine is located some 10 miles from Rat Portage, Ont. It has been found too expensive to operate, and the shareholders are unwilling to make further advances. The assets were some time since sold to the Coronation Gold Mining Co.

At a meeting of the Imperial Coal & Coke Co., which owns about 100 square miles of coal lands in the East Kootenay district, British Columbia, held in Montreal May 11, the following directors were elected: W. Herbert Evans, James W. Pyke, Frank R. Thompson, C. W. Spencer, Montreal; Randolph MacDonald, Toronto; O. G. Laberee, Andrew Laidlaw, Spokane. Mr. W. Herbert Evans was chosen as president of the board. Work upon the company's property was commenced April 15, and is to be vigorously pushed.

A test has been made at the Provincial assay office, Belleville, of a sample of the iron ore lately discovered between Redwater and Rabbit Lakes, and it has been pronounced bessemer ore, with a low percentage of sulphur. The assay shows metallic iron 57.83%; sulphuro, 0.048; phosphorus, 0.014; insoluble matter, 11.30%.

A decision of interest to the officials of mining corporations has just been given at Montreal in an action brought by W. J. Turner against Thomas A. Fee, president of the Red Bluff Mining Co., for $217, claimed for work done for the company. The plaintiff has previously obtained judgment against the company, but as it had no assets was unable to realize. He then sued the president personally and obtained judgment for the full amount of his claim.

The Syndicate Mining Co., Ltd., capital $50,000, with head office at Toronto, has secured a provincial charter of incorporation, the provisional directors being Solomon P. Kineon, Louis E. Ziegle, Geo. Kinsey and Emmons J. Gardner, all of Cincinnati, O.; Frank W. Whitaker and C. M. Baker, both of Hamilton, O., and Robert C. Le Vesconte, of Toronto.

London. May 21.

(From Our Special Correspondent.)

A remarkable opinion was expressed by a judge of the High Court this week to the effect that the vendor of a mining property was perfectly justified in submitting picked samples of the ore instead of average samples taken throughout the mine. It may readily be guessed that the judge who made this remarkable statement was Mr. Justice Ridley. The episode prompts me to refer to the long-standing grievance among technical men of all sorts that trials of cases involving nice points in advanced technology are often misunderstood and misinterpreted by our judges, owing to their lack of familiarity with the subjects involved. It has often been proposed that assessors should be nominated to sit with the judge to explain the technical details. At the present time questions involving railway and canal administration go before a special court of this kind, and in all actions in the Admiralty Court there are experts connected with Trinity House on the bench beside the judge. The proposition to have experts to advise the judge, in all technical cases, is therefore not a new idea, but only an extension of a principle, the value of which in practice has been thoroughly demonstrated. It is obvious that the presence of such an expert in Mr. Justice Ridley's court would have obviated such a misconstruction of a mining man's duties, and in the present case would have caused an entirely different verdict to be given.

The case in which this incident occurred was that of Kneebone versus Elmore, and was a claim for the balance of the purchase money in connection with the sale of the Sygun mine in North Wales. The mine was acquired by Mr. Stanley Elmore some eight years ago from Mr. Kneebone, with a view to obtaining a supply of copper ore for the Elmore copper tube process and was alleged by Mr. Kneebone to be a 6 or 8% proposition. It was soon found that the ore was not of the grade represented and Mr. Elmore refused to complete the payments. Mr. J. H. Collins paid a short visit to the mine, and without taking extensive samples, judged that the grade could not be higher than 2% copper. After the mine had been idle for a time, the Elmore oil concentration process came along, and at the suggestion of Bainbridge, Seymour & Co., who desired that the process should be applied to some of the abandoned British mines, the Sygun mine was acquired by the British Ore Construction Syndicate from Mr. Elmore, who still had Mr. Kneebone's claim outstanding against him. Before the plant was put up, no sampling of the mine was done, as it was considered that Mr. Collins' report was sufficient. In a very short time it was found that the ore, though existing in large quantities, was of exceedingly low grade. Prof. Henry Louis was then commissioned to sample the property closely. He arrived at the staggering conclusion that the average copper contents were not greater than 0.8%, though, he added, that by careful sorting, the grade might be brought up to 1%. It was still thought possible to run the mill at a profit, and in any case the performance would give a practical demonstration of the value of the oil concentration process. Over a run of several months the copper contents did not exceed 0.67%, which, in spite of many admirable economies, was not sufficient to pay expenses. The claim of Mr. Kneebone for the balance of purchase price was, under the circumstances, resisted by Mr. Elmore, and the action mentioned was brought to recover it. Owing to the judge giving his opinion that a vendor is always entitled to show his goods under the most favorable circumstances, Mr. Kneebone succeeded and Mr. Elmore has had to pay up.

The judgment is all the more surprising, as it was definitely proved in court that Mr. Kneebone knew perfectly well that the representations were false. It was shown that he had sold the same property twice before, and on both occasions the purchasers had been glad to get out of their bargains. With such evidence before him, any judge with common sense or with a desire to imbue himself with the spirit of legitimate mining, would not only have dismissed Mr. Kneebone's action, but granted the counter claim for false representation. It is so easy to be wise after the event, but this case forms another argument for close sampling of a property before the expenditure of considerable sums on it. In Mr. Elmore's case it was not particularly necessary to go to any great expense on a report on the property, because the purchase price to be paid to Mr. Kneebone was comparatively small. Under the circumstances Mr. Collins' short examination was sufficient to show that the property was no good as a smelting proposition. When, however, the property was acquired for a different object, and under different circumstances—for working it as a low-grade proposition by the oil concentration process—it would have been, as events turned out, the best policy to have sampled it closely before putting up an expensive plant.

Perth. April 25.

(From Our Special Correspondent.)

Kalgoorlie.—Some important discoveries have been made during the last few weeks. The Associated at the 10th level has cut a body of ore, assaying over 4 oz. gold per ton, for a width of about 16 ft., presumed to be a continuation of the No. 2 Tetley's cross lode. Lake View Consols has struck telluride ore at the 1,600-ft. level, averaging over 1 oz. of gold per ton. The Great Boulder has cut ore at the 1,200-ft. level, in a borehole; assays so far give 7.5 dwts. per ton. The ore reserves of the mine are estimated at about 400,000 tons, valued at £2,000,000. The Great Boulder portion of the rich Horseshoe Boundary lode has opened up very well at several levels. In the North Kalgurli good ore has been crosscut at the 500-ft. level, assaying over 1 oz. per ton for a width of 4 ft. The Golden Horseshoe's March yield was 17,106 fine oz. from 13,409 tons treated.

Coolgardie.—The public battery is nearly completed and will soon be started.

North East Coolgardie.—The Sons of Gwalia yield for March was 5,208 oz. fine gold from 8,697 tons. The Sons of Gwalia South Co. crushed 97 tons for a yield of 136 oz. The Lights of London has put through a trial crushing of 58 tons from a lode 30 ft. wide for a yield of 46 oz. of gold.

Murchison and Northern Fields.—The Great Fingall Consolidated main shaft is now down 1,080 ft. The Great Fingall Associated is opening well. Many new leases are being taken up, especially on the North Murchison at Black Range. The State battery has started. A very rich parcel of ore is being put through on Hacks lease, probably worth 10 oz. per ton. At the 14-mile patch a rich reef, 6 ft. wide, has been found. Gold can be seen on surface for a length of 300 ft. At Tuckanarra, 90 tons from the Nemesis lease yielded 225 oz. of gold. Owing to the great number of large mines under the control of Messrs. Bewick, Moreing & Co., there is much discussion as to the advantage of this to the mining industry. The Kalgoorlie merchants complain that they no longer supply the mines, and that the company buys in Fremantle in large lines, or imports direct from England and America. Politicians who seek the support of the labor unions are taking the matter up. Wm. Pritchard, in a published answer to the critics, shows that the company has reduced working costs enormously, is making much lower grade ores pay, and is thereby lengthening the lives of the mines.

Sydney. April 11.

Tasmania.—The returns for the last quarter of 1903 have just been issued. The total value of the mineral output for 1903 was £1,513,762, including gold, £265,682; copper and copper ore, matte, etc., £480,176; tin, £310,920, and silver and silver-lead, £423,030; there was a decrease in gold, silver, copper, and an increase in silver, lead and tin. Mount Lyell for March treated at the smelters 30,949 tons of ore and the converters put out 777 tons of blister copper containing 767 tons of copper, 80,358 oz. silver and 1,854 oz. of gold. The excess of gold and silver is owing to the working up of the accumulation of middle products. The North Lyell output was 350 tons per day and Lyell Blocks 6,000 tons per week.

A pumping plant, capable of raising 8,000,000 gal. daily is being installed at the Tasmania gold mine, Beaconsfield.

Queensland.—The mineral output for 1903 included:

	Value.
Gold, 668,546 oz. fine	£2,839,813
Copper, 4,916 tons	285,122
Tin, 3,708½ tons	243,149
Coal, 507,801 tons	164,798

The grand total was £3,686,096, an increase of £375,496 over 1902.

In the Charters Towers district Brilliant Central has had a most successful half-year; 19,240 tons milled gave an increase in yield of 2 dwt. 11 grains per ton, equivalent to a total of £76,993; a large amount of development and exploratory work was also done.

The Chillagoe returns for March show an output from copper smelters of 107 tons copper and 30,758 oz. silver; from lead smelters 271 tons lead and 16,718 oz. silver.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of the ENGINEERING AND MINING JOURNAL.—Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL, and making this office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and be of any service to them that they can.

TO ENGINEERS VISITING LONDON.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers nonresident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution, and thus enjoy the advantages of temporary office accommodations in the city of London.

PERSONAL.

Mining and metallurgical engineers are invited to keep the ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

Mr. D. W. Brunton was in New York on May 27.

Mr. A. C. Beatty is expected in New York about June 5.

Mr. E. N. Van Cortlandt, of Denver, is visiting New York.

Mr. S. F. Parrish, manager of Le Roi mine at Rossland, B. C., has resigned.

Mr. F. H. Minard, of Denver, has been in New York during the past week.

Mr. R. B. Bruce is manager of the Paradise mine at Wilmer, British Columbia.

Mr. Benjamin B. Thayer is confidential advisor on mines to Mr. H. H. Rogers.

Mr. G. A. Denny has been appointed consulting engineer to the Rand Collieries, Ltd.

Mr. Myles Brown has returned from India to England on furlough for six months.

Mr. W. H. H. George, from Wellington, New Zealand, sailed by the *Oceanic* for London.

Mr. George M. Barber is on his way to Peru, to take charge of the Huinac copper mines.

Mr. Alfred Tilly, manager of the Frontino & Bolivia mines, in Colombia, is now in London.

Mr. J. H. Creswell, lately at Bodie, Cal., is examining gold mines at Nagyag, in Hungary.

Mr. H. E. Crawford, of New York, is examining a large mineral tract near Buena Vista, in Ohio.

Capt. Henry Adams, of South Bethlehem, Pa., is in New York on his return from Colorado.

Mr. W. Morton Webb has returned to Leadville, Colo., after a three months' absence in Mexico.

Mr. Stuart Croasdale has returned to Denver from a professional trip in New Mexico and Arizona.

Mr. T. Bruce Marriott, manager of Himan Concessions, Ltd., has returned to London from West Africa.

Mr. R. Gilman Brown sailed from San Francisco for Honduras on May 21. He will return about July 27.

Mr. C. O. Baker, president of Baker & Co., of Newark, N. J., and New York, sailed May 18 on the *Cedric*.

Mr. John D. Ryan, of Butte, Mont., has been appointed managing director of the Amalgamated Copper Company.

Mr. Walter J. Browning, manager of the Mazapil Copper Co., has left Mexico for a two months' holiday in England.

Mr. George K. Fischer, constructing engineer for the Utah Consolidated at Salt Lake City, has returned from California.

Mr. C. W. Fielding, managing director of the Rio Tinto, is visiting the Mountain Copper mines at Keswick, California.

Mr. Joseph M. Bidwell has been appointed assistant manager of the American Smelting & Refining Co.'s plants in Utah.

Mr. J. H. Batcheller, formerly with the Bunker Hill & Sullivan mines, at Wardner, Idaho, is now at Treadwell, Alaska.

Mr. Max J. Welch has returned to Chicago from a trip to the West, having inspected the new Copper Queen and Washoe smelters.

Mr. F. W. McConnel has left Parral to take charge of the Los Angeles gold mines, 50 miles northwest of Guadalupe y Calvo, Mexico.

Prof. W. P. Blake, of the University of Arizona, has returned to his summer home at Mill Rock, New Haven, Conn., for the vacation.

Mr. Louis Cohen, of Denver, has been appointed mill superintendent for the Montezuma Lead Co. at Sta. Barbara, in Chihuahua, Mex.

Mr. Leon Cummins, cyanide expert of San Francisco, Cal., has returned from the mines of the American Copper Co. at Blanchard, Ariz.

Mr. G. M. Gouyard returned to Denver from Mexico recently and departed for Idaho on professional business, to be absent about a month.

Mr. George C. Thomas has resigned as director of the Philadelphia & Reading Coal & Iron Co. He is succeeded by Mr. E. T. Stotesbury.

Messrs. Alexander Hill & Stewart, of London, have been appointed consulting engineers to the Peak Hill Goldfields Co., Ltd., in Australia.

Mr. C. W. Pritchett has returned to Denver from Mexico after an absence of about five months, and expects to remain there until July 1.

Mr. H. Pemberton, of Montreal, Quebec, has gone to Boundary Falls, B. C., as manager of the Montreal & Boston Consolidated mines and smelter.

Mr. Percy Widdas, of the Durham College of Science, England, arrived recently, and will inspect the principal coal mining properties in Pennsylvania.

Mr. H. W. Hardinge was in New York this week on his return from Rossland. He expects to spend the summer in professional work at Massey, Ontario.

Mr. G. A. Overstrom has been appointed to the chair of mine, plant and mill designing in the State School of Mines, University of Utah, at Salt Lake City.

Mr. N. Westheimer, of New York, of the Standard Consolidated mines at Bodie and the Brunswick mine at Grass Valley, Cal., is making a tour of inspection.

Dr. G. W. Maynard is now in Pioche, Nev., where he is engaged in examining several of the old mining properties, with a view to a resumption of operations.

Prof. A. Marston, who has had charge of the civil engineering department for the last 12 years, was recently elected dean of the division of engineering, at the Iowa State College.

Dr. F. J. H. Merrill, State geologist of New York, retires from that position on June 1 and has opened an office in New York at 20 east 42d street, for the practice of economic geology.

Mr. Frederick Hobart, associate editor of the ENGINEERING AND MINING JOURNAL, is visiting St. Louis, with the purpose of studying the mining and metallurgical exhibits at the Exposition.

Mr. E. M. Griffiths, of C. W. Burton Griffiths & Co., of London, was in New York recently, and can be addressed care of the General Electric Co. at the Louisiana Purchase Exposition, St. Louis.

Mr. George Ernst, assistant superintendent of the Wetherill Separating Co.'s ore testing plant at Newark, N. J., has resigned and will act as advisor to those interested in the concentration of ores and minerals.

Mr. H. C. Bosworth, with the Denver Fire Clay Co. for nearly ten years, will after June 1 reside in the city of Mexico, where he is interested in the firm of Hoffmann-Pinther y Cia, dealers in chemists' and assayers' supplies.

Mr. Charles Pettigrew, superintendent of the Maryland Steel Co.'s works, Sparrow Point, Md., has retired, and, accompanied by his wife and daughter, will spend the summer in Scotland. He will make his permanent home at Bridgeport, Connecticut.

OBITUARY.

Capt. P. H. Scott, one of the oldest mining engineers of the West, died recently at Denver, aged 70 years. He was connected with the Comstock lode in Nevada during the days of Mackay and O'Brien.

J. J. J. Keswick, of London, died May 18. He was for the last eight years chairman of the Rio Tinto Co. and a director of several Indian coal companies. He was a member of the firm of Jardine, Matheson & Co., China and Indian merchants, a firm intimately connected with Matheson & Co., of London.

William H. Pettee, senior professor of mining engineering at the University of Michigan, died suddenly at Ann Arbor May 26. He was born at Newton Upper Falls, Mass., January 13, 1838, was graduated at Harvard in 1861, and after pursuing post-graduate studies and teaching there for four years, studied three years at Freiberg, Saxony. From 1869 to 1875 he was assistant professor of mining at Harvard. In 1875 he went to the University of Michigan as professor of mineralogy, economic geology and mining engineering. He was a member of the American Institute of Mining Engineers, the American Association for the Advancement of Science, the Geological Society of America and the American Philosophical Society.

SOCIETIES AND TECHNICAL SCHOOLS.

NATIONAL ASSOCIATION OF MANUFACTURERS.—At the close of a very successful meeting, held in Pittsburg last week, the following executive officers were re-elected: President, David M. Parry, Indianapolis; secretary, Marshall Cushing, New York; treasurer, F. H. Stillman, New York. Vice-presidents were elected as follows: H. T. Morton, California; John W. Nesbot, Colorado; A. H. Bullard, Connecticut; George P. Bent, Delaware; C. N. Fay, Illinois; C. A. Carlisle, Indiana; Thomas S. Laughlin, Maine; S. Baldwin, Maryland; George F. Coffins, Massachusetts; William R. Farrand, Michigan; W. H. Regenery, Minnesota; J. W. Van Cleve, Missouri; E. P. Pike, New Hampshire; Edward F. Hartshorn, New Jersey; William McCarrell, New York; J. F. Thompkins, North Carolina; J. A. Jeffrey, Ohio; W. D. Pines, Alabama; Major J. H. Hauson, Georgia; F. L. Kretsinger, Iowa; D. C. Nunnemacker, Kentucky; J. Scott Parish, Virginia; Daniel C. Ripley, Pennsylvania; H. B. Chamberlain, Tennessee; Henry Fairbanks, Vermont; H. S. Smith, Wisconsin. Atlanta was chosen as the next meeting place.

INDUSTRIAL.

The open-hearth plant of the Eastern Steel Co., Pottsville, Pa., will be placed in operation shortly. The four 50-ton furnaces are about completed and the installation of the three mills is rapidly progressing. It is reported that the capital stock of the company is to be increased from $5,700,000 to $9,400,000.

The Robinson Machine Co., of Pittsburg, Pa., has completed recently, or is completing, an endless rope haulage engine with 14 by 18-in. cylinders for the Sayre Mining & Manufacturing Co., at Sayre, Ala., a 16 by 24-in. endless rope haulage engine and a 20 by 30-in. slope haulage engine for the Newer Coal Co., at Macdonaldton, Pa.

American condensers are to be installed in the large power house which is being constructed at Chelsea, London, S. W., by the Underground Electric Railways Co. The International Steam Pump Co. secured the contract, which is valued at $125,000. The British Westinghouse Electric & Manufacturing Co., Ltd., secured the contract for the electric equipment which will represent an expenditure of fully $3,000,000.

The Vulcan Iron Works has completed recently, or is now completing, at its Wilkes-Barre, Pa., shops, the engines, jigs, screens, rolls and picking tables for the new Nottingham breaker of the Lehigh Valley Coal Co.; besides a hoisting engine with double drums 10 and 14 ft. in diameter and cylinders 30 by 48 in., for the same company. The drums will take 1,280 ft. of 1.75-in. wire rope and the breaks will be asbestos lined. Of cement machinery, the Vulcan company is completing five rotary kilns, 7 ft. and 5.5 ft. in diameter and 60 ft. long, and five 7 ft. by 6-ft. marl dryers for works at Manchester, Mich., and is also making clay and coal dryers.

The East Rands, Proprietary Mines, Ltd., of South Africa, has just bought a complete Allis-Chalmers wet grinding tube mill 5 by 22 ft. The Electrical Development Co., of Canada, has purchased of the Allis-Chalmers Co., a 12 in. by 16 in. self-contained throttling engine, a No. 5 Gates breaker, a No. 5 B elevator, 51 ft. 6 in. between centers, and considerable other new machinery. The same company has sold to Thos. Phee, one of its complete No. 5 railway portable crushing plants, including the 80,000-lb. capacity car which is to carry it; to J. & C. W. Ryan, a No. 4 D Gates crusher; to Knox, Schlapp & Co., Ltd., Australia, a No. 3 D Gates breaker complete; to the Atlas Portland Cement Co., of Missouri, three 5-ft. by 22-ft. tube mills.

The committee of experts appointed by the Tennessee Coal, Iron & Railroad Co., Sloss-Sheffield Steel & Iron Co. and the Republic Iron & Steel Co., to investigate values of coal and ore properties of the companies mentioned, looking to a consolidation of the three corporations, has completed its work. The report is mostly statistical. There is but little talk in Alabama, where the greater portion of the property investigated is located, to show that the original plan—that of consolidation—is to be carried out soon. The Tennesse Coal, Iron & Railroad Co. has paid $10,000 for an option and on the purchase price for 36 acres of land in the vicinity of Boyles, Ala., six or eight miles north of Birmingham. The Tennessee company will make tests for dolomite or limestone within the next 60 days. The property is under control of J. H. Dean, of New York.

The Allis-Chalmers Co. has about completed changing the driving power for the machine tools in its Scranton, Pa., shops from steam to electricity, separate alternating current motors at 250 volts pressure replacing steam engines. The generating plant is a Crocker-Wheeler 500-kw. dynamo, direct connected to an Allis-Chalmers cross-compound engine with 28 and 44-in. cylinders. Work has been somewhat slack, but recent inquiries indicate that the anthracite mining companies, in view of present prices of machinery, will likely place many contracts before long. The Allis-Chalmers plant has orders for two roasting furnaces, several large blowing engines and will build two steel plate mine fans 28 ft. in diameter for the Delaware & Hudson Co. These fans will be of the Guibal type, modelled after those erected at the Bliss, Pettibone and Auckinclose shafts of the Delaware, Lackawanna & Western Co., some years ago.

The C. B. Bartlett & Snow Co., of Cleveland, O., has received from the United States Geological Survey an order for a No. 3, style C, four compartment direct heat rotary dryer to be used in the plant on the exposition grounds at St. Louis for testing the coals and lignites of the United States. This plant will be under the direction of the United States Geological Survey. The tests will be conducted for the purpose of demonstrating the most economical methods for the utilization of different coals. The testing plant will consist of two standard boilers, a gas producer, coke ovens, washery plant, and two or more briquetting plants. One Corliss and one steam turbine engine will be operated, and in connection with the gas producing plant one explosive gas engine. The power generated by these plants will be utilized for operating the working exhibits in the Mines building. The testing plant will be on the ground reserved for outdoor mining exhibits, near the Palace of Mines and Metallurgy. Messrs. E. W. Parker, J. A. Holmes and M. R. Campbell have been appointed to conduct this work.

TRADE CATALOGUES.

The Advance Packing & Supply Co., of Chicago, Ill., has issued a neat 32-page catalogue, in which are listed the many styles of Advance packings for steam, water, ammonia, etc. The catalogue has the usual quota of illustrations, with prices, etc.

The Hart-Parr Co., of Charles City, Iowa, has issued a 28-page catalogue, dealing with its oil cooled gasoline engines and their advantages in different lines. They are shown in styles and sizes from 2 to 40 h. p., stationary and portable. The company's traction engine, double cylinder, is given considerable space, setting forth the capabilities of this combination.

The Stephens-Adamson Manufacturing Co., of Aurora, Ill., has issued a comprehensive 208-page catalogue of its extensive line, including many styles of conveyors, belting, pulleys, shafting, hangers, etc. Ore buckets, sprocket wheels and chains, loading hoppers, self-propelling trippers and numerous accessories also go to fill up this valuable publication, which is profusely illustrated and contains many tables of power and capacity bearing on the machinery listed, which will prove of material aid to the customer in making selections.

The Jeffrey Manufacturing Co., of Columbus, O., is sending out bulletin No. 7, which is a description of an Alabama electric coal haulage plant, and also calls attention, through a number of illustrations, to the electric mine locomotives manufactured by the company, with their capacities, cost of operation, etc. Other printed matter being sent out by the company includes a treatise on electric haulage as opposed to mule haulage in a Colorado mine. A supplement to the Century rubber belt conveyor catalogue is another recent issue of this company.

GENERAL MINING NEWS.

ALABAMA.

JEFFERSON COUNTY.

Woodward Iron Co.—This company at Woodward, has installed a crusher with a capacity of about 4,000 tons daily and expects to blow in its third furnace shortly. The new furnace will be larger and more modern than the two now in operation.

ALASKA.

The Post Office Department has announced that navigation on the Yukon river, in Alaska, is re-opened, and that mail matter of all classes may be accepted by post offices for transmission to any destination in Alaska Territory. This also includes mails for Dawson and all other places in the Canadian Yukon. The first trip up the Yukon was made by the steamer *Portland*, which was equipped with an ice prow, and which carried approximately 14,000 pounds of mail matter. This embraced practically the first shipment of newspapers and merchandise to that section since last November.

NOME.

Wild Goose Mining Co.—The Miocene Canal Co. sold a controlling interest in its 60 miles of canals and mining ditches to the Wild Goose Mining Co., managed by Charles D. Lane, of San Francisco, the price being $1,000,000. This canal virtually controlled the mines of the Nome district. The new owners have informed other companies that have been using the water that the price will be reduced and every favor will be extended operating mines.

ARIZONA.

MOHAVE COUNTY.

(From Our Special Correspondent.)

Cracker Jack.—A 2-ft. vein of ore that averages $40 a ton in gold and silver is being developed in this mine, at Chloride.

El Dorado.—Don Catlin, who owns this mine, at El Dorado cañon, has purchased a new steam engine and pumping plant for the mine. The main shaft is down 235 ft., but at this depth water prevented work. The shaft at this depth is in a good sized vein of free milling gold ore.

Gold Road.—An $18,000 bar of gold bullion from this mine, at Acme, was the result of seven days' run.

Keystone.—A company has taken this mine over from James Uncapher and is unwatering and cleaning out the old workings. A 40-stamp mill is contemplated.

Minnesota.—The Elspass mill, which has been in operation on this mine at Chloride for some time past, has been compelled to close down until more water can be had. A new pumping plant has arrived and a pipe-line is being laid to the Merrimac mine, five miles west, to supply the water.

Sunrise.—This mine, near Niggerhead, continues in high-grade shipping ore in the east drift on the 240-ft level. Work on the west drift has been suspended. The mine is pumping an abundance of water.

CALIFORNIA.

AMADOR COUNTY.

Central Eureka Mining Co.—The 85 miners employed at this property, Jackson, are taking out plenty of rock of good paying grade.

Fremont Consolidated Mining Co.—The strike is still on at this mine, Drytown, Arthur Goodall, manager, and all work at mine and mill is practically at a standstill.

Madrone.—At this mine, near Volcano, three tunnels have been run, 500, 600 and 800 ft. respectively. Each miner employed is now getting out about a ton of paying rock daily.

Oleta.—An 800 ft. tunnel is to be run on the Clark claim by Thos. Mayon to tap the gravel channel at a more convenient point.

CALAVERAS COUNTY.

Summit View.—A strike of high grade ore has been made in this mine on the Beckwith Ranch, Salt Spring valley. The operators intend erecting a mill this season.

Utica Mining Co.—This company at Angels is about to install 40 more stamps at the Stickle mill.

EL DORADO COUNTY.

Darling.—Superintendent L. H. Wilkins has men at work grading for an electric plant which is to be installed.

Eureka.—Superintendent Everson, of the El Dorado Copper Co., has resumed work on this mine at Placerville. A thorough survey of the old underground works will be made.

Havilah.—The 20-stamp mill on this mine at Nashville is running night and day on ore being stoped from the 800-ft. level. The new electric plant is in operation and 50 men are at work.

Rescue Gold Quartz Mining Co.—A hoisting plant and pump are being installed at this mine near Rescue, A. F. Anable, superintendent.

River Hill Mining Co.—The shaft of this mine at Placerville is now down 1,040 ft. and a station is being made at the 1,000 ft. level.

INYO COUNTY.

World Beater.—Geo. Montgomery is about to put in a cyanide plant at this mine near Ballarat.

KERN COUNTY.

Garlock.—The coal mines at Garlock, 12 miles north of Randsburg, have been purchased by the Pacific Coast Coal Co. of San Diego, and will be worked.

NEVADA COUNTY.

Kenosha.—This mine is now being operated by electricity. There are four shafts on the property.

Spanish Ridge.—There are 17 men at work in this mine, Washington district, and a tunnel to crosscut the ledge is being driven. There is a 20-stamp mill on the property, but Henry Egan, superintendent, expects to enlarge the milling plant at once.

White Bear.—A nugget weighing 28 oz., worth $475, was found at this mine recently, this being a little larger than the one found at the same mine a few weeks since.

Zeibright.—This company, at Little Bear valley, will shortly put in a compressor plant and later on will increase the milling capacity by adding 10 stamps to the present mill. There are 17 men at work.

PLACER COUNTY.

Buckeye.—This mine, on the Forest hill divide, has been sold to J. A. Johnson and others for about $40,000. The mine adjoins the old Mayflower drift mine at one time very productive.

Dutch Flat Golden Drift.—A company bearthis name has been organized to mine under the old town of Dutch Flat.

Gold Blossom.—This property at Ophir, now under bond to Alameda men, will soon have the pumps started to unwater it.

Solden.—This company, near Towle, H. W. Morris, superintendent, is putting in a 4-drill compressor. Ten stamps are to be added to the present 10-stamp mill.

Three Stars.—At this mine, Ophir, B. F. Hartley, superintendent, 60 men are employed and the 20-stamp mill is kept busy crushing ore.

PLUMAS COUNTY.

Cameron.—The drift claim of Angus Cameron on the North Fork of Feather river has been purchased by E. L. Dow, W. D. Huntington and R. B. Mott, of San Francisco and Oakland. There is a good water right connected with this property. Work will now be done on a more extensive scale than heretofore.

Gold Run.—This company, owning the Frank Thomas claim, C. A. Poage, superintendent, has started up work. The Seattle company at Emigrant Hill has also started. The water from Silver lake having been turned into the Elizabethtown ditch, provides a water supply for this section.

SAN LUIS OBISPO COUNTY.

Two companies of placer miners have begun operations on the ocean beach claims at Point Sal. Each has a special gold saving appliance supposed to be better than those previously used on the California beaches.

Sadie and Elizabeth.—These two new quicksilver claims in Adelaide district are owned by G. E. Watkins and the Allen estate. One is being opened under superintendence of James Bell. There are three distinct ledges on the property.

SHASTA COUNTY.

Clover Creek Mining Co.—This company, H. S. Wilson, superintendent, has acquired a group of quicksilver claims in Clover creek, near Millville, 16 miles east of Redding. An experimental furnace plant will be erected at once.

Great Western Gold Co.—This company, at Ingot, expects to have the smelter at the Afterthought mine ready to run by September next.

SIERRA COUNTY.

Sierra Buttes.—This company, at Sierra City, Richard Phelan, manager, intends increasing its milling capacity to 100 stamps.

Telegraph.—The Alleghany Mining Co. has made final payment on this mine and now has 1,100 acres of land in one body in the Red, Blue and Keystone channels.

SISKIYOU COUNTY.

Masonic Bar.—This mine, near Griders ferry, on the Klamath river, has been leased to E. L. Hoyt and L. H. Cornell, who will work it extensively.

Pereira.—This placer claim near Hawkinsville, where the $492 nugget was found this month, has been purchased by T. J. Nolton, of Yreka.

SONOMA COUNTY.

Cloverdale Quicksilver Mining Co.—Lawley Bros., owners of this property, are putting in a new 20-ton furnace, the old 10-ton one having become too small for the amount of ore.

Bright Hope.—A 14-ton furnace is being erected at this quicksilver mine on the Armstrong ranch.

TRINITY COUNTY.

Quimby Gold Mining Co.—This company, at New River, has ordered a 20-stamp mill. If Humboldt county will bridge the Trinity river, the mining company will construct 25 miles of road to its mines and bring the trade to Eureka. The country is very mountainous.

TUOLUMNE COUNTY.

California Draper Mines.—This new company has practically paid off the debts of the old company and the Draper mine is being put in shape for active mining operations.

Golden West.—A drift is being run east on the 400 level and superintendent McPherson expects at any time to tap the hanging wall vein. The mill is being thoroughly repaired.

Horseshoe Bend.—It is expected that the property will shortly be equipped with a 100-stamp mill.

YUBA COUNTY.

Yuba-Nevada Mining Co.—This St. Louis company recently formed to take over the Campbell hydraulic mine at Smartsville, intends to install the necessary machinery to work the mine. It is expected to be a dredging proposition.

COLORADO.

CHAFFEE COUNTY.

Coma.—This mine in the Whitehorn district, near Salida, was turned over to R. G. Baker and associates of Denver recently under a $20,000 bond and lease. The property is owned and was operated by John Johnson. At the bottom of the present 55-ft. shaft is an ore body reported to be 4 ft. thick averaging $16 to the ton in gold. The management will explore the vein to a depth of 500 feet.

CLEAR CREEK COUNTY.

Senator.—This mill at Dumont, has been secured by John G. Roberts and will be used to run the ores from the Jo Reynolds mine. A force of men is at work making the repairs. It is expected that the mill will be ready for operation not later than June 1.

Stanley Mining Co.—This company has been incorporated to take over the properties of the old Stanley and Salisbury companies, near Idaho Springs. In addition to the mines there is a complete mining and milling equipment, water rights, trackage, a 250-h. p. compressor plant, and a large steam hoisting plant. Some of the laterals have been opened up to considerable length, and the mine has been worked to a depth of 700 ft. The reorganization, it is reported, was effected through Col. A. G. Brownlee of Denver, who secured control through the agreement of all the parties to the litigation, which has tied up the property about four years. C. A. Gehrmann, of Denver, will have charge of the work when the resumption takes place.

Waltham Mining & Milling Co.—A new mill has been completed on this property, having 15 tons per day capacity, and it is treating the low grade ore coming from the open cut. A hoisting plant has been installed, and a shaft sunk 100 ft. An Elspass mill is to be installed which will give the plant an additional capacity of 60 tons per day, and the company expects also to install cyanide tanks for the treatment of the tailings. The company is working the Ward lode and mill on Jackson bar, near Idaho Springs.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

Decatur Gold Mining, Milling & Tunnel Co.—This company, developing a group of claims in the Moon gulch section, is figuring on the erection of a 50-ton plant this season. W. M. Bloomer, Rollinsville, Colo., is manager, and the property is being opened up with tunnel workings.

East Notaway.—Returns from one shipment from the 420 west level gave values of 12.67 oz. gold, 9.80 oz. silver and 3.91% copper, or a net value of $247 per ton, while another lot from the 555 west level gave a net value of $324 to the ton. S. A. Josephi, Denver, is manager.

Gold Dirt.—A 70-h. p. boiler is being installed at this property in the Independent district, recently purchased for $120,000, and shipments will soon commence. A new mill is to be erected, heavier developments will be soon in full swing and a new central shaft will be sunk if the present plans are carried out. W. H. Knowles, Perigo, Colo., is manager.

Penobscot Mining & Milling Co.—This company owns 85 acres and a millsite in the Independent district. It has been steadily developing the group for some time past and has decided to erect a milling plant of about 50 tons daily capacity, and in the meantime will thoroughly test the ores at different plants.

Considerable milling and smelting ore carrying fair values in gold, silver, copper and lead has been opened. P. J. Hamble, Perigo, Colo., is manager.

Pittsburg.—A shipment made from the 600 west level gave returns of 9.30 oz. gold, 13.70 oz. silver and 14% copper, or a net value of $208.05 per ton. B. L. Campbell, Central City, is superintendent, and the property is operated by the Cashier Gold Mining & Reduction Co.

Yankee Consolidated Mining, Milling & Tunnel Co.—This company has started its new mill at Lombard, nine miles west of Central City. A large force of men is to be employed on extensive developments. Henry I. Seeman, Denver, is manager.

OURAY COUNTY.

Revenue.—An important strike is reported in this mine, near Ouray. While drifting on the vein on the 350-ft. level beneath the tunnel, a 9-in. streak of gold grade ore was encountered, which is thought to be the edge of the famous ere shoot which existed in the levels above the tunnel. Much water was encountered recently, but heavy pumps were installed, which overcame this difficulty. About 50 miners are employed.

TELLER COUNTY—CRIPPLE CREEK.

(From Our Special Correspondent.)

C. K. & N. Gold Mining Co.—This company will pay an extra dividend of 1c. per share as well as the regular 1c. dividend, making nearly $30,000 to be distributed among the stockholders. Some very rich ore is being taken out and the dividends are paid from royalties from leasers. It is understood about $115,000 in royalties have been received by the company. Horace Granfield is operating the lease.

El Paso Consolidated Gold Mining Co.—A strike of good ore is reported on the Russel and Sharpe lease on the Lonaconing claim. At present it is too early to tell what the ore amounts to. The property is close to the Old Gold.

Gold Coin.—Only a few men are working on company account, but quite a large number of lessees are at work on blocks on different levels, and a number of these are shipping ore. The Gold Coin is controlled by the Woods Investment Co. and has produced a large amount of money in the past. From all appearances the leasing system is proving a success. F. M. Woods, of Victor, is in charge.

Gold Sovereign.—The Cripple Creek Gold Temple Co., operating a lease, is shipping a large amount of ore. A trainload of 10 cars of ore was sent out this week, and it is understood that the ore was worth about $2,000 per car.

Monument.—The shafthouse at this mine, on Battle mountain, was burned May 20. The engine and boiler plant are reported ruined, causing a loss of about $1,500.

Wild Horse-Londonderry.—Judge Seeds has decided this case in favor of the Wild Horse. The case involved the extra-lateral rights of certain veins. It was rather a surprise that the decision was so completely in favor of the Wild Horse. It is understood that the case will be taken to a higher court.

GEORGIA.

LUMPKIN COUNTY.

Crown Mountain Gold Mining Co.—At the recent meeting in Dahlonega the following directors were elected: A. J. Warner, C. M. Merrick, J. C. Rogers, John S. Morton, F. M. Marriott, J. F. Moore. The old officers were re-elected.

Dahlonega Consolidated Gold Mining Co.—At the annual meeting in Dahlonega recently, the following officers were chosen: D. C. Shaw, president; Mark Hopkins, vice-president; F. W. Bainbridge, secretary and treasurer. Directors: D. C. Shaw, George H. Breymann, Mark Hopkins, J. P. Coates, Frank G. Thomson, E. A. Cole, F. W. Bainbridge.

Standard Gold Mining Co.—At the recent election in Dahlonega, the following directors were chosen: F. W. Bainbridge, J. M. Bloomer, George H. Breymann, M. A. Hadden, E. W. Newton, D. C. Shaw, Louis Siebert, F. T. Walcott, Ferdinand Welch.

IDAHO.

ADA COUNTY.

Highland Power Co.—The plant of this company on the Boise river, 20 miles above Boise, was swept away May 22. The loss is about $150,000. The river had been dammed with a crib dam, and the power house stood under the river bank, 60 ft. below the dam. This plant was used for pumping water for placer mining. The home office of the company is in New Hampshire.

LEMHI COUNTY.

(From Our Special Correspondent.)

Grunter and Kentuck.—These two gold properties at Shoup are to be consolidated and worked under one management. They have been idle for several years. The Grunter has a record of having produced $200,000. The Kentuck produced $500,000; the mines have been equipped each with a 10-stamp mill, which are so dilapidated that a new mill will be necessary.

Kittie Burton Gold Mines.—This property, at Ulysses on Indian creek, 35 miles from Salmon has in operation a 30-stamp mill. The capital stock is 150,000 shares of $1 each.

North Fork Reduction Co.—F. W. Folger, S. M. Shaw and others have organized this company to operate the mines and 20-stamp mill formerly owned by the defunct American Development & Mining Co., at Gibbonsville. The entire property has been purchased by the new owners for cash from the receiver. It will be the policy of the new company to have the mines worked on the tribute system, charging for running the ore through the mill. This entire property, which was purchased and equipped by the American Development & Mining Co. on a basis of fully $300,000, was sold to the present holders for $10,000. The equipment consists of a chlorination plant, a 20-stamp mill and cyanide plant. The group of mines consists of about 20 quartz claims and a large acreage of placer holdings on Sheep creek.

INDIANA.

DAVIS COUNTY.

(From Our Special Correspondent.)

Cable.—These coal mines, south of Washington, which have been in operation for many years, have closed down indefinitely.

KNOX COUNTY.

(From Our Special Correspondent.)

Sugar Loaf Mining Co.—An explosive was dropped into the shaft near Vincennes recently which wrecked the cage and did other damage. There is no clew to the identity of the persons who have attempted repeatedly during the past four months to destroy the mine.

VANDERBURG COUNTY.

(From Our Special Correspondent.)

Evansville & Ohio River Coal Co.—This company has purchased the Newburg mine of the John Archibold Coal Co. The present output of the mine is 150 tons per day, but the capacity will be increased to 400 tons per day. The purchasers are getting machinery on the ground to start their new mine near the Archibold mine. This mine will have a daily capacity of 2,400 tons. The company has the mineral rights under the Three Mile Island and under 1,700 acres contiguous to the mines. Offices will be opened at Evansville.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

Champion.—Rock shipments are now at the rate of 1,450 tons per day. The boilers for the new 100-drill air compressor will be completed in a short time, when the four heads in the mill will be supplied to their full capacity of 2,000 tons a day.

Franklin.—The Mineral Range Railroad Co. is grading for a spur to No. 2 shaft at the Junior branch of the mine, and 1,000 ft. of track will be laid next week. Rock shipments from No. 2 shaft will commence in a short time. This will permit the operation of all four heads in the mill at Grosse Point.

Michigan Smelting Co.—The new plant at the mouth of Cole's creek, on Portage lake, 1.5 miles west of Houghton, will go into commission in a few days. One melting and one casting furnace will be blown in at the start and the other furnaces, one casting and two melting will be in commission by July 1. The plant will smelt the mineral of the Champion, Trimountain and Baltic mines, which own 60% of the stock of the smelting company, and also the mineral from the Wolverine, Mohawk and Atlantic companies, which own the remaining stock. The new plant cost about $500,000.

Quincy.—Sinking in No. 8, or the Mesnard shaft, is under way below the 20th level, at a depth of 2,600 feet.

St. Mary's Mineral Land Co.—Diamond drill exploratory work south of the Winona mine has been discontinued. The sinking of a permanent working shaft at that point is under consideration.

Section Fifteen.—Exploratory work on this property, owned by the company recently organized by Reginald C. Pryor, of Houghton, has revealed the presence of an amygdaloid bed greatly resembling the Baltic lode. It was cut in a test pit and will be thoroughly explored.

Tamarack.—A diamond drill on the bottom level of No. 2 shaft is driving horizontally to the east to cut the Kearsarge amygdaloid formation, 200 ft. distant.

Trimountain.—Repairs to the triple-expansion three-stage air compressor, which was designed to supply power for 40 drills, have greatly increased its efficiency. It now operates the 65 drills in use in the mine.

IRON—MARQUETTE RANGE.

Bluc.—This mine, at Negaunee, operated by the Oliver Iron Co., subsidiary concern to the United States Steel Corporation, closed down recently letting out 300 men. The suspension is attributed to trouble between the Lake Carriers' Association and the Masters & Pilots.

McKenna.—At this exploration, near Quinnesee, a vein of good ore 8 ft. wide has been located. The vein was first encountered near the surface and was only 8 in. wide, but has gradually increased as the test-pit was sunk.

IRON—MENOMINEE RANGE.

Loretto.—This mine, near Norway, has suspended operation, throwing 100 men out. Some 100,000 tons of ore are in stock at the property. Lack of transportation is the cause.

Mansfield.—This mine, Crystal Falls district, operated by the Oliver Mining Co., has been shut down for an indefinite period. Development work has been in progress for some time and it was expected the new shaft would be ready to go into commission in August.

Traders.—This mine at Iron Mountain, controlled by the Republic Iron & Steel Co., is sending ore to the shipping port. There are 100 men employed, working day and night shift.

MONTANA.

BROADWATER COUNTY.

(From Our Special Correspondent.)

Stevenson Mining & Development Co.—The old Free Coinage group near Winston is under development by this company with 10 miners employed. The property adjoins the old H. & H. property. The ore is principally gold in an iron sulphide. There are 13 claims in the group, some of which have produced considerable ore under small operators before the consolidation.

DEER LODGE COUNTY.

(From Our Special Correspondent.)

French Gulch Dredging Co.—The property of this company will be taken over by G. S. McNeill. It is the purpose of Mr. McNeill to remove the Mollie Gibson dredge, now at Ruby, where it operated for 5 years, to French gulch, where a Risdon boat has been digging for the past three years. The property at French gulch is owned by the estate of the late Marcus Daly and consists of about 1,100 acres of creek bottom at the lower end of the gulch.

JEFFERSON COUNTY.

(*From Our Special Correspondent.*)

Argonaut.—This property, 1.5 miles from Alhambra Springs, will be operated by a new company after an idleness of 11 years. The Argonaut Mining Co., just being organized to take over the property by purchase from H. M. Hill, of Lemon Grove, Cal., will install new machinery and sink a new shaft to a depth of 300 ft. The ore is lead and silver in a granite formation.

Copper Mountain Mining Co.—The shaft on this property, near Corbin, is down 150 ft. The first cross-cut is to be run on the 500-ft. level.

Elkhorn Queen.—This property near Elkhorn is under lease and bond to Helena parties who will operate the property for the iron sulphides which occur as a pyrrhotite. Large bodies of this class of ore were left in the old mine workings when it was worked some years ago for the silver lead ore produced. The bond is for $30,000; Z. T. Vinsin, of Helena, will have charge.

LEWIS & CLARKE COUNTY.

(*From Our Special Correspondent.*)

Empire.—Morris and Leach have purchased this property at Empire, near Marysville, from E. A. Wetmore and Owen Byrnes. The deal includes the mines, 60-stamp mill and the 500-ton cyanide plant. The latter was built three years ago to work the tailings which had accumulated from the stamp mill. The property is owned by the Gold Belt Mining Co.

MADISON COUNTY.

(*From Our Special Correspondent.*)

Bismark Nugget Gulch Mining Co.—This company at Brandon has a contract with Sheridan to furnish electric lights for the city. A plant placed on Mill creek, where the company has a fall of over 300 ft., will afford power for a concentrating mill, run the machinery at the Toledo mines of the company, light all the company's workings, and also Sheridan.

NEVADA.

ESMERALDA COUNTY.

(*From Our Special Correspondent.*)

Goldfield.—Shipments of high-grade gold ore from this camp continue to increase. The Combination mine now has an accumulation of 1,500 sacks on the dump and the January lease has 6,500 sacks ready. The vein on the 112-ft. level was cross-cut for 70 ft. without encountering the other wall. The whole of this will average $35, but 375 sacks from this level assayed over $800 per ton. At Diamond-field C. D. Lane, of California, has purchased claims, at Black Butte, for $200,000, paying $10,000 cash, and has put a force of men to develop the vein, which is 12 ft. wide and averages over $50 per ton.

EUREKA COUNTY.

(*From Our Special Correspondent.*)

Gerald.—This iron property for the six months ending March 31, 1904, has shipped to the American Smelting Co. at Salt Lake, iron ore of the net value of $15,208. The Southern Pacific railway has built a spur to the mine, which is now shipping 150 tons daily.

LINCOLN COUNTY.

(*From Our Special Correspondent.*)

Camp Duncan.—This recently discovered district, 12 miles northeast of Searchlight and 3 miles from the Colorado river, is producing high grade gold ore. On the Woods mine a shaft has been sunk 100 ft. on a vein 8 ft. wide averaging $150 per ton at that depth. On the O. K., ore of the value of $200 per ton is being sacked for shipment to El Paso, Tex.

OREGON.

(*From Our Special Correspondent.*)

Columbia.—This property is operating under the management of Frank S. Baillie, of Sumpter. The mill handles 60 tons per day, the method being amalgamation, concentration and cyanide treatment.

Eureka & Excelsior.—The Bourne Gold Mining Co., of Portland, is now operating this property, development work having commenced last November, after an idleness of several years. Jonathan Bourne, of Portland, is president of the company, with James S. Wyatt as manager. The property comprises 14 patented claims extending to both sides of Cracker creek. The ground on the north side of the creek joins the North Pole mine. The ore consists of an arsenical iron pyrite, carrying gold and silver, there being generally about 2 oz. silver to 1 oz. of gold. From 8 to 12% of the gold is recoverable by amalgamation, the principal method being concentration. The mine is opened by six adit levels—three on each side of the creek. The present mill of 80 to 90 tons daily capacity is being partially reconstructed, and when finished it will contain 20 stamps, plates, hydraulic classifiers, Wilfley tables, Frue vanners and leaching vats for cyanide work. Most of the pyritic material, with its accompanying gold and silver, will be obtained in the concentrates. The sand and slime tailings will be cyanided separately. The mill is equipped to operate both by steam and water power, the water supply being ample for about eight months in the year. A Pelton 5-ft. wheel has 300-ft. head of water. The mine is at Bourne.

North Pole.—This property belongs to, and is operated by, the Eastern Oregon Mining Co., controlled by Baring Bros., of London, and is under the management of E. Melzer, at Bourne. The mine is operated through a series of adit levels which open the vein to a vertical depth of over 1,000 ft. An aerial tramway, 1.5 miles long, delivers the ore to the mill on Cracker creek, where about 120 tons per day are treated. There are 30 stamps, followed by plates, Wilfley tables, Frue vanners and cyanide leaching. A varying percentage of gold is recovered on the plates. A silicious-pyritic concentrate is made that runs about $240 per ton, the values being principally gold. It runs 30 to 40% silica. The sands and slimes, comprising the tailings, are cyanided separately, the first by percolation and the second by agitation. The percentages of extraction by concentration and cyanidation are about equal. The total recovery in the mill amounts to about 85%.

PENNSYLVANIA.

ANTHRACITE COAL.

People's Coal Co.—This company which controls and operates the Oxford colliery is making preparations for building an addition to their present breaker. New boilers are being put in. The addition will be placed on the westerly side of the breaker and several other improvements will be made. The culm to be run through the washery will be taken from a dump which has been made since the company secured control of the breaker, some four years ago.

Philadelphia & Reading Coal & Iron Co.—This company's new coal basin northwest of Pottsville, in the Deep Creek valley, is reported to have developed a 10.5 ft. and a 6 ft. vein of valuable coal.

Phoenix Park.—This colliery is a co-operation owned by the Philadelphia & Reading Coal & Iron Co. near Minersville. A new breaker is to be erected alongside of the old structure to prepare the coal that the new openings underground will produce.

Stirling.—A spark from a blast set fire to this mine May 23. The gangway in which the fire is burning has been hermetically sealed and 300 miners have resumed work.

BITUMINOUS COAL.

Hays.—These coal mines of the Monongahela River Consolidated Coal & Coke Co., Hays borough, Pittsburg, have closed for the summer throwing 200 miners out of work.

Hustead-Seamans Coal & Coke Co.—This company is building a coking plant at East Millsboro, near Brownsville. The plant will consist of 200 ovens, contracts for the erection of which will be awarded shortly.

O'Connell Coal & Coke Co.—This company is a new concern that has built a 20 oven coke plant in Menallen township, Fayette county, and started the fires in the ovens. The contract for 30 additional ovens has been let.

SOUTH DAKOTA.

LAWRENCE COUNTY.

(*From Our Special Correspondent.*)

Columbus Consolidated.—A new vein has been encountered in the west workings of the Columbus mine, north of Homestake, at the 500-ft. level. There are at present some half dozen veins crosscut in this mine, aggregating 700 ft. of ore, averaging about $3.75 a ton free milling.

Golden Empire.—Electric dredges will be installed by this company on a 12-ft. placer bed, in Bear gulch district. The company is developing 10,000 acres of ground, including a valuable tin estate.

Goldstake.—A tunnel is being put through a large vein of free-milling ore by the Goldstake company, north of the Homestake. Assays average $3.

Reliance Gold Mining Co.—An old discovery of uranium is being investigated on this property, on Annie creek. The former owner had a shaft 90 ft. deep, cross-cutting a 15-ft. vein carrying 3% uranium, according to tests. The company will erect a large cyanide plant on Annie creek this summer. Excavations are partly made. Twenty-seven shoots of ore have been explored, averaging $6.40 per ton. The mill is designed for Chilean mills, Moore slime process, and will use electric power.

Wasp No. 2.—The Venture Corporation, of London, has secured a new option on the 150 acres of ground surrounding this mine, in the Yellow creek district, which runs till August 1; consideration about $400,000. The deal includes the Wasp No. 2, Wasp No. 4, the Kickapoo group and Averill group.

UTAH.

JUAB COUNTY.

(*From Our Special Correspondent.*)

Tintic Ore Shipments.—During the week ending May 27 shipments amounted to 121 car loads, as follows:—Uncle Sam Con., 1; May Day, 1; Yankee Con., 1; Tetro, 3; Salvator, 2; Centennial-Eureka, 47; Mammoth, 12; Ajax, 2; Grand Central, 21; Victor Con., 1; Lower Mammoth, 1; Carisa, 2; La Clede, 1; Bullion-Beck, 2; Gemini, 18; Garnet, 1. Uncle Sam Con., concentrates, 3.

Uncle Sam Consolidated.—The old Humbug vein has been recovered in a winze sunk from the tunnel level. The vein is about 4 ft. wide. Two cars of ore averaged better than $100 to the ton. What appears to be a good showing of copper has made its appearance on the 500-ft. level.

SALT LAKE COUNTY.

(*From Our Special Correspondent.*)

Bingham Consolidated.—This company's smelter produced during the week ending May 28 303,726 lb. of copper bullion.

Columbus Consolidated.—This company's electric power plant will be given a trial run on June 1. Excavations for the new 100-ton mill will be started about June 10.

Continental Alta.—The leasing system has been inaugurated at this property, leasers to operate in the older portions of the mine.

Davis & Gebhardt.—For a consideration of $100,000 this Bingham property has been bonded to a Massachusetts syndicate.

United States—Shipments of copper bullion from this smelter during the week ending May 28 aggregated 250,758 lb.

Utah Consolidated.—Shipments of copper bullion from this company's smelter during the week ending May 28 aggregated 301,046 lb.

WASHINGTON.

FERRY COUNTY.

Mountain Lion.—The castings for the four Huntington crushing mills were put in recently and the mill started. There is a large reserve of ore broken and ready for treatment by the Hendryx process.

Bodie.—The mill and cyanide plant on this mine, 29 miles northwest of Republic, is expected to be ready by June 15. The mine is

developed by four tunnels to a depth of 400 ft. C. M. Fassett is president.

KINGS COUNTY.

Black Diamond Coal Mines.—These mines have been sold by the Bellingham Bay Improvement Co. to the Pacific Coast Co., which has its headquarters in San Francisco. The price of the property is not stated. The mines are 30 miles southeast of Seattle, on the Columbia & Puget Sound railroad, which is owned by the Pacific Coast Co. They have been opened by a corporation known as the Black Diamond Coal Co., which is controlled by the Bellingham Bay Improvement Co., through ownership of the stock. The mines ship chiefly to San Francisco, and are considered a valuable property.

FOREIGN MINING NEWS.

AFRICA.

NATAL.

The Mines Department reports that during the month of March 65,347 tons of coal were mined, showing an increase of 11,998 tons as compared with March, 1903. The number of persons employed in the coal mines during the month was 234 white men, 2,918 negroes and 1,851 East Indians. Coal exported was 1,233 tons, and 27,766 tons were sold to steamers at the port of Durban.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Ore Shipments.—For the week ending May 21 shipments aggregated 16,160 tons, as follows: Granby, 11,190; Mother Lode, 3,776; Emma, 930; Oro Denoro, 264; total for the year to date, 315,498 tons.

BRITISH COLUMBIA—NORTHEAST KOOTENAY DISTRICT.

Paradise.—This company reports that from April, 1901, when the mine was purchased as a prospect, up to December 31, 1903, shipments amounted to 1,610 tons of lead carbonate ore, the gross value of the metals being $76,911, without smelter deductions. The mine is at Wilmer.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Shipments.—For the week ending May 21 shipments amounted to 4,642 tons, as follows: Le Roi, 1,190; Centre Star, 1,215; War Eagle, 1,167; Le Roi, No. 2, 460; Le Roi No. 2, milled, 300; Spitzee, 60; I. X. L., milled, 150; Jumbo, 100; total for the year to date, 150,610.

Rossland Power Co.—This company's 200-ton concentrator is expected to start about June 5. The last shipment for the cyanide plant and the transformers for the electrical power station have been received.

BRITISH COLUMBIA—VANCOUVER ISLAND.

Tyee Copper Co.—This company reports that its smelter at Duncan's Station, Vancouver Island, ran 30 days during April. There were 6,715 tons Tyee ore smelted, giving a return, after deducting freight and refining charges, of $80,373: an average of $11.97 per ton.

MEXICO.

MEXICO.

Esperanza, Ltd.—The April report states that 12,133 tons of dry ore were crushed, yielding bullion valued at $130,091. The total income is estimated at $130,417 and the expenses at the mines at $83,335, leaving a net profit of $47,082.

MINING STOCKS.

(Full quotations given on pages 908 and 909.)

New York, June 1.

The stock market is in an expectant mood, and though sales are comparatively small, there is still a healthy undertone which promises an early recovery. Copper stocks attract little attention. Amalgamated sold in a small way at $51@$49.625, and no special trading seems likely until after the annual meeting on June 6. Anaconda was invisible. Greene Consolidated, of Mexico, is weaker at $14.875@$14.75, but transactions are limited. White Knob, of Idaho, sold again at $7. Montreal & Boston, of British Columbia, has extended the time for depositing stock under the merger plan to June 30.

The shares of the American Smelting & Refining Co. show renewed strength, as a result of the published favorable financial condition and the ability to pay an "employees' dividend" of about $100,000 from surplus earnings. The common stock, yielding $5 annually, now sells above $53, while the preferred, paying $7 in dividends, stands at a fraction over $97.

A surprise is the declaration of the initial dividend of 1.5% on the $5,250,000 outstanding common stock of the Federal Mining & Smelting Co. Six months ago the first quarterly payment of 1.75% was made on the $10,500,000 issued preferred stock. Both dividends are payable on June 15 to stockholders of record on June 3.

There was little doing in the gold and silver stocks, and with few exceptions prices were at last week's level. In the Comstock group Consolidated California & Virginia moved at $1.70, Caledonia at 86c., and Hale & Norcross at 80@81c. Ontario Silver, of Utah, sold at $4.20, and Brunswick, of California, strengthened to 17c. per share.

Boston. May 31.

(From Our Special Correspondent.)

There were but four market days in the week's trading, so that fluctuations in mining shares have been unusually narrow. At the best, trading has been restricted of late and two days taken out make events almost unimportant. Continued selling pressure of Shannon Copper depressed the price to $6.06¼, from which it has recovered but a trifle. There is a theory that the liquidation has been for pool account, as several holders of this stock are raising capital for another purpose. On the decline from $10 the number of Shannon stockholders has increased from 1,100 to about 1,250. Old Dominion has lost $1, to $12.50, on limited dealings. Daly-West has been steady around $23.50@$24, but Consolidated Mercur has declined to 25c. on rather free offering.

Copper Range has gone off about $1, to $42, on limited dealings and Montana Coal & Coke has settled to $3.75. The fact that Amalgamated is examining this property does not inspire trading. Amalgamated closes the week about the same as last. The fact that Heinze was in town lately created no interest so far as known, it being purely a social visit. Amalgamated, as a matter of fact, continues to furnish the bulk of commissions in this market. Following this comes Shannon, Copper Range, Granby and Allouez, but fluctuations barely amount to the commission charge. Mohawk is off $1, to $39. Calumet sold at $444 ex-dividend to-day, with the closing asked price $452. Quincy is steady at $82@80 and Tamarack at $85. Utah is quiet at $33.62½. Boston Consolidated has been heavy around $5.50@$6.

Colorado Springs. May 27.

(From Our Special Correspondent.)

Trading in Cripple Creek shares on the local exchange opened this week much more briskly and trading was heavier than during the previous week. Nearly all the higher class stocks showed good strength and the week ends with notable advances in several of them. In spite of the lawsuit against the El Paso company, its stock has advanced from 80 to 86½c. Elkton closed at 66⅛, showing a gain of about 2c. During the week Portland reached $1.74, but closed at $1.72½. Among the cheaper stocks Doctor-Jack Pot and C. C. Consolidated were the most active. There appears to be a better demand for the higher class stocks and a good market for next week is expected. Monday being a legal holiday, there was no call on the exchange.

Salt Lake City. May 28.

(From Our Special Correspondent.)

There was not much life to the mining stock market during the past week and the total sales brought only $33,353. Stocks fluctuated but little, but with few exceptions, the tendency was lower. Consolidated Mercur suffered badly and closed without any indication of regaining its strength. The weakness is due to metallurgical difficulties encountered at the mill and which the management is making strenuous efforts to overcome. Butler-Liberal has commenced marketing ore again and the stock shows signs of stiffening. Daly and Daly-Judge hold their own well, while Daly-West has been in some demand at higher prices. Considerable Little Chief changes hands, but at lower figures than last week. Sacramento, with dividends still a matter of uncertainty, continues low. Star Consolidated are still in bad order, both ending the week with declines. During the month of May, six Utah mines distributed dividends. The Silver King of Park City headed the list with $100,000; the Daly-West came next with $72,000; the Grand Central, of Tintic, took third place with $25,000; The Annie Laurie represented the Gold Mountain district to the amount of $12,500; the Century, of Park Valley district, paid $3,000, and the Utah of Fish Springs, $1,000.

San Francisco. May 26.

(From Our Special Correspondent.)

Business in the Comstocks was quite moderate this week, and prices were fairly well maintained. Towards the last, however, there was some falling off in the quotations for the North End stocks.

Some quotations noted are: Ophir, $5.75; Consolidated California & Virginia, $1.70; Mexican, $1.70; Best & Belcher, $1.50; Hale & Norcross, 65@68c.; Gould & Curry, 30c.; Chollar, 20c.; Potosi, 18@19c. per share.

On the San Francisco & Tonopah exchange sales were rather good, and there was some activity in buying, with slight improvement in prices. Montana Tonopah sold for $1.60; Tonopah Belmont, 64@66c.; Tonopah Midway, 37c.; Rescue, 37c. per share.

On the California exchange business in oil stocks was better than in the preceding week, and a good many shares were sold. Home was quoted at $1.50; Reed Crude, $1.50; Oil City, 59c.; Independence, 27@ 28c. per share. Some large parcels of Independence came to hand.

COAL TRADE REVIEW.

New York, June 1.

ANTHRACITE.

The anthracite market shows some falling off from the activity which has characterized the past two months. Urgent orders, which have been pressing on most producers, are about filled, and the prospect is that by the end of June the market will have settled down into the usual summer quiet. Jobbers will then have a chance to push sales through the summer. The advance of 10c. took effect on June 1 on all tidewater coal of domestic sizes. Prices on those sizes remain very firm, and there is no probability of a break.

In Western territory, especially in the Chicago district, considerable embarrassment is being caused by the continued delay in the opening of lake navigation. Ordinarily, coal would now be arriving in Chicago quite freely, but up to date the masters and pilots who are out remain firm, and there is no probability of an immediate settlement. Under the circumstance, orders continue to be taken at prices prevailing at time of contract, but there is no certainty of delivery, and this will probably cause some embarrassment later in the season.

In New York territory, and through the East, steam sizes are a drug in the market. Small coal is being stored in large quantities; while the production at the breakers, of course, continues, many washeries are being closed down, or are running part time. Pea coal is especially dull, owing to the lower priced buckwheat being forced on the market, and also to the competition of bituminous coal. Manufacturing demand is not particularly strong, and these steam sizes are suffering accordingly.

BITUMINOUS.

The seaboard bituminous coal trade continues dull, with no signs of any improvement in the market in the near future. Most of the coal now coming forward from the mines is on standing contract, and deliveries on these are being reduced in volume by consumers. Indeed this condition, if it should continue for a

few weeks, will indicate that demand in the late summer and fall should be active, on account of the shortage of stocks, in which the present limited demand must surely result. The general feeling in the trade, however, is that little or no improvement is to be expected before the latter part of July at the earliest. Prices are weaker, some contracts having been closed in the past week, on the basis of $1 a ton at the mines, or even a little lower. This, however, is merely meeting the prices made earlier in the season on shipments to Norfolk and Newport News.

The curtailment of shipments from the mines by producers is being felt by the railroads, and at the shipping ports. To meet this condition, some roads have stopped all coal trains from Saturday noon until Monday morning. This disorganizes the handling of coal at tidewater points all the fore-part of the week. The strike of the longshoremen has also affected some individual shippers at New York harbor points.

In the trade to the Far East matters are very quiet, and orders are few and far between. Apparently there is not business enough to take care of the vessels in the coastwise trade, as rates are weak, and, if anything, declining. Along the Sound trade is quiet, and on a reduced scale. Dealers at present are giving most of their attention to anthracite. New York harbor trade is taking very little coal just now. Shipments from the mines are accordingly reduced. The railroads are taking note of any coal standing on track at the ports and are holding back cars from mines accordingly.

All-rail trade has been cut down pretty closely, and consumers are only ordering as they use up their present stock. Transportation from mines to tidewater is good, except for the stoppage over Sunday noted above. Car supplies are up to all demand, except where the railroads have purposely curtailed them, owing to coal standing at tidewater.

In the coastwise market vessels are more plentiful and rates are weak. We quote from Philadelphia as follows: Boston, Salem and Portland, 80@90c.; Lynn and Newburyport, $1; Bath and Portsmouth, 90@95c.; Long Island sound ports, 75@80c.; Bangor, $1.05@$1.10; Saco, $1.05@$1.10 and towages.

Birmingham. May 30.

(From Our Special Correspondent.)

Notwithstanding some labor troubles in several sections of the coal district of Alabama, the aggregate production is very healthy. There is some complaint heard as to the supply of empty cars, the mines on the Southern railway in particular suffering. The trouble at Blockton, in Bibb county, where the daily production is quite heavy, brought about by grievances on the part of the employees against the superintendent, are now coming to a head. The district executive board recommended that the men, who were out since May 3, return to work and the grievances would be taken up with the company.

Fire in Mine No. 5 of the Tennessee Co. at Wylam, in the Birmingham district, has stopped the output at that place for a few days. One life was lost in this fire. The property is not damaged much, the flames destroying an engine-house.

Coke is in good demand. The Woodward Iron Co. has called for bids for the erection of 300 coke ovens, while the Sayre Mining & Manufacturing Co. has under construction at present 200 coke ovens.

Chicago. May 31.

(From Our Special Correspondent.)

Market conditions in coal are unchanged for the week, but uncertainties continue to demoralize business. The coke depression was the worst factor, as prices went further down—in fact struck the lowest point reached in several years. This, with the unsettled state of the lake trade served to put hard coal in the class of futures. Light cargoes continue to be unloaded at the smaller ports, but not in sufficient quantities to have any effect on the business. In Chicago, the principal shortage is in small egg and chestnut, both of which are in active demand. Card prices prevail, excepting where orders cannot be filled, in which case, prices are made as of the date of order. Bituminous has been weak, both in demand and prices. The disposition on the part of producers still continues to favor curtailment of the output, in the hope of a rally to at least a small extent. One operator stated that he could buy on the open market cheaper than he could produce the goods. There is not a promising outlook for the near future.

Cleveland. May 31.

(From Our Special Correspondent.)

The only development of the past week has been among the railroads. Many of them had declared embargoes against the shipment of coal to the lakes, since the shippers were disposed to use the cars for the purpose of storing coal against the time when the boats would start. The railroads now have a plethora of cars and are finding that business comes rather hard. They are therefore disposed to cater to the desires of the shippers, in order to get what business is moving. Some of the roads, therefore, are putting out their cars and are permitting them to hold coal until navigation is open, thus virtually breaking the embargo. The market has not been improved by this device. A little more coal has been brought to the lakes, but not much, and the trade has been rather dull. The prices of steam coal have shown a disposition to soften slightly, but have not broken since they are now down to about rock bottom. The strike in the Eighth district is still on. Steam coal is bringing about $1 at the mines. There is a good demand for up-the-lake steam coal, but the number of boats moving is hardly sufficient to even start to supply that need. The market in consequence is quiet. Lake rates are not discussed, but seemingly the season's carrying business will be done on the basis of 40c. and 50c. to Lake Superior and Milwaukee, respectively.

San Francisco. May 26.

(From Our Special Correspondent.)

Mr. J. W. Harrison's circular of May 26 says: "Since our last five vessels have arrived from Australia with coal; total, 9,845 tons. Thirty-eight vessels are on the charter list to carry coal from Australia, with a carrying capacity of about 92,000 tons. Some of these vessels will not load before October next, hence their deliveries here will be pretty well scattered up to the end of the year. There are no changes of any moment in market values, as business in the fuel line for the moment is exceedingly quiet. Offerings are being made by importers at a shade less for future shipments. Some of the yards here are carrying large stocks of Coast coal, for which a slightly reduced price is being asked. As we are assured of a fair crop of grain later on, it is anticipated that better outward freights should prevail; and an improvement in grain freights outward signifies lower Colonial coal freights inward. Hence, a reduction in the carriage of coal may be figured upon later in the year. There is no decrease in the output of fuel oil, and those utilizing it show no desire to modify its use. The low price and varied advantages in its use hold its consumers. There is no change in its value. Contracts are freely offered at present prices."

Pacific coast coals in large lots to dealers are quoted as follows: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle and Bryant, $6.50; Beaver Hill and Coos Bay, $5.50; white ash, $5.25. For Rocky Mountain coals, ex-car, to dealers, prices are $14 for Colorado anthracite, $11.50 for Castle Gate, Clear Creek, Rock Springs and Sunnyside. Eastern coal is nominal at $14 for Pennsylvania anthracite and $13 for Cumberland. Foreign coal in cargo lots is quoted at $13 for Welsh anthracite, $8.50 for cannel and $7.50 for Wallsend and Brymbo.

Foreign Coal Trade. June 1.

Exports of coal and coke from the United States for the four months ending April 30 are reported by the Bureau of Statistics of the Department of Commerce and Labor as follows:

	1903.	1904.	Changes.
Anthracite	597,051	483,980	D. 113,071
Bituminous	1,549,581	1,555,053	I. 5,472
Total coal	2,146,632	2,039,033	D. 107,599
Coke	129,062	163,397	I. 34,335
Totals	2,275,694	2,202,430	D. 73,264

Exports of coke were chiefly to Mexico. The exports of coal were distributed as follows:

	1903.	1904.	Changes.
Canada	1,574,384	1,268,984	D. 305,400
Mexico	245,422	364,498	I. 119,076
Cuba	160,149	166,846	I. 6,697
Other West Indies	83,198	89,223	I. 6,025
France	401	5,309	I. 4,908
Italy	11,973	19,490	I. 7,517
Other Europe	6,287	13,851	I. 7,564
Other countries	64,818	110,832	I. 46,014
Totals	2,146,632	2,039,033	D. 107,599

The light exports to Canada this year were due chiefly to delay of shipments and difficulties in transportation, resulting from severe weather and heavy snowstorms in January and February.

Imports of coal into the United States for the three months ending March 31 are reported as follows:

	1903.	1904.	Changes.
Canada	752,024	470,597	D. 281,427
Mexico	5	221	I. 216
Great Britain	1,176,841	34,737	D. 1,142,104
Other Europe	356	50	D. 306
Australia	57,115	73,614	I. 16,499
Japan	5,314	18,384	I. 13,070
Other countries	1,019	756	D. 263
Totals	1,992,674	598,359	D. 1,394,315

Of the coal imported this year 8,875 tons were classed as anthracite, the rest being bituminous coal. The imports in the first part of 1903 were, of course, exceptionally large.

Messrs. Hull, Blyth & Co., of London and Cardiff, report, under date of May 21, that the coal market continues unaltered. The tone is still easy. Prices are: Best Welsh steam coal, $4.14; seconds, $4.02; thirds, $3.78; dry coals, $3.84; best Monmouthshire, $3.48; seconds, $3.42; best small steam coal, $1.92; seconds, $1.74; other sorts, $1.62.

The above prices for Cardiff coal are all f. o. b. Cardiff, Penarth or Harry, while those for Monmouthshire descriptions are f. o. b. Newport, both exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2.5% discount.

The freight market is weaker in tone for Mediterranean ports; Eastern and American ports remain steady. Some rates quoted from Cardiff are: Marseilles, $1.42; Genoa, $1.41; Naples, $1.41; Las Palmas, $1.62; St. Vincent, $1.68; Rio, $2.16; Santos, $2.64; Buneos Aires, $1.74.

IRON TRADE REVIEW.

New York, June 1.

The iron and steel markets continue extremely dull, and in consequence of the buyers' policy of waiting, prices generally are being shaded. Sales of pig iron in the primary markets have been small and generally at a lower range. The Association price for steel billets holds only nominally, and good orders can be placed at considerable below the schedule figures.

In finished material, also, business has been very quiet. There has been some inquiry for bars from car-builders, but the quantities asked for would not be sufficient to arouse attention in anything but a dull market. In structural steel, only small orders are being placed, and the large contracts which were looked for have not come forward as yet.

The iron ore situation continues unchanged. No ore has been started as yet for the lower lakes, and it is uncertain when the ore boats will be able to start. The strike of the masters and pilots promises to be a very stubborn one.

It is reported that considerable export business has been taken lately, but the principal interest is keeping very quiet about it, and it is difficult to ascertain facts.

Exports and Imports.—Exports of iron and steel, including machinery, from the United States, for April and the four months ending April 30, are valued by the Bureau of Statistics of the Department of Commerce and Labor as follows:

	1903.	1904.	Changes.
April	$8,933,742	$10,574,612	I. $1,640,870
Four months	31,278,818	38,141,327	I. 6,862,509

The increase for the year was 21.9%. The chief items of export for the four months were as follows, in long tons:

	1903.	1904.	Changes.
Pig iron	4,982	17,023	I. 12,041
Bars	15,097	17,102	I. 2,005
Rails	2,967	41,758	I. 38,791
Sheets and plates	5,098	9,176	I. 4,078
Structural steel	9,986	10,987	I. 1,001
Wire	35,270	38,502	I. 3,232
Nails	11,346	13,649	I. 2,303

Exports of iron ore this year were 275 tons, against 2,117 tons reported last year.

Imports of iron and steel into the United States for April and the four months ending April 30 were valued as follows:

	1903.	1904.	Changes.
April	$4,643,879	$1,733,176	D. $2,910,703
Four months	17,035,152	7,146,581	D. 9,888,571

The decrease for the four months was 58.1%. Imports in the first quarter of 1903 were exceptionally large, owing to the great demand then existing. The chief items of these imports were as follows, in long tons:

	1903.	1904.	Changes.
Pig iron	315,438	34,766	D. 280,672
Billets and blooms	118,669	5,475	D. 113,194
Scrap iron and steel	33,678	4,933	D. 28,745
Bars	13,566	5,991	D. 7,575
Rails	54,467	14,722	D. 39,745
Wire-rods	6,142	7,023	I. 881
Tin-plates	19,673	21,295	I. 1,622

Imports of iron ore for the four months were 117,403 long tons, 236,739 tons in the corresponding period in 1903: showing a decrease of 119,336 tons, or 50.3% this year.

Birmingham. May 30.

(From Our Special Correspondent.)

But little improvement is to be noted, if any at all, in the pig iron market conditions in the Southern territory. Shipments and production are still heavy, but this can be accounted for when it is stated that delivery is being made on orders taken in two and three months since. There is very little demand for iron hereabouts right now and quotations are still uncertain, ranging between $9 and $9.50 per ton for No. 2 foundry. The $9.25 per ton rate appears to be the popular quotation. Southern furnacemen are still very confident that there is going to be an early improvement in the conditions. A denial was made last week that any concerted movement was on foot in this section to reduce the production while the market was dull.

The following quotations are given: No. 1 foundry, $9.50@$10; No. 2 foundry, $9@$9.50; No. 3 foundry, $8.75@$9; No. 4 foundry, $8.50 @$9; gray forge, $8@$8.50; No. 1 soft, $9.50 @$10; No. 2 soft, $9@$9.50.

There is no change in the situation in finished iron and steel. The Gate City rolling mills of the Republic Iron & Steel Co. continue the only mills in operation in this district. The labor troubles at the Bessemer rolling mills of the Tennessee Coal, Iron & Railroad Co. are still on, the tonnage grievance not coming to any head. The machinery in the Bessemer mills has all been painted and prepared for a lengthy idleness, from all appearances. All salary men around this plant have received notice that their services would not be required after June 1.

The steel plant of the Tennessee Co., at Ensley, the plant of the Alabama Steel & Wire Co. and the works of the Empire Plow Co., also at Ensley, are all doing well.

The cast-iron pipe factories are, perhaps, the busiest establishments in the iron trade in this district. All these industries in this district are working on full time and have numerous orders on hand to be filled.

Chicago. May 31.

(From Our Special Correspondent.)

Slow selling in last week's iron market gave way at the beginning of this week to a somewhat bearish condition, with a disposition on the part of handlers to sell, even at shaded prices. This feeling brought about a uniform decline in prices of Birmingham bars of $1 per ton, the quoted prices being now $9.50; sales are reported at $9.25. Some sales of Birmingham No. 2 were made for the market east of Chicago at $9 for delivery in Ohio during the last half of the year. A little better condition prevails in the western market, due to buying on the part of some of the railroads, the Northern Pacific having bought 3,000 tons of car steel for use in 1,000 cars which they purpose to build at once. Sales of 4,500 tons in addition are reported for car building from a western agent. In structural steel, the sales have been in small lots for local building purposes, one Chicago contracting firm having taken 1,400 tons, this being notable as it was the largest sale of the week. The South Chicago plate mill, closed last week for repairs, opened on Monday, with orders for a comfortable amount of work.

Cleveland. May 31.

(From Our Special Correspondent.)

Iron Ore.—The market has heard of some sales of ore, but it cannot be learned there have been any material contracts closed. The big buying movement of the year seems to be some distance away as yet. The prices are now, however, tacitly agreed upon at $3.25 for bessemer old range and $3 for bessemer Mesabi f. o. b. Lake Erie ports. The strike of the masters and pilots is still on and the only change that has been made has been a tender of the services of the Civic Federation to intervene in the difficulties. Some of the masters have suggested a compromise, which may be made. The settlement is still, however, some days away.

Pig Iron.—The buying of foundry pig iron is still hand-to-mouth, with hardly a tendency toward improvement. Some of the consumers are disposed to cover their needs for the next year, but are not ready, until there has been a change in the future of the pig iron makers toward the ore sales, to make any purchases for second half delivery. The prices are a little too uncertain as yet. The price still holds, for spot shipment, at about $12.50@$13 in the Valleys for No. 2. There is a fair call for malleable and the market for bessemer and basic seems to be about at the minimum. The prices generally quoted for bessemer and basic is about $12.25@$12.75 in the Valleys for all deliveries.

Finished Material.—The tendency toward a quiet market has been even more manifest during the past week than at any time during the weeks which have preceded and during which time quieter conditions have come to prevail in the steel trade. The confession that the market has turned dull for the present is probably accountable for the depression and pessimism which have come to prevail. That both contract booking and spot buying have eased there is little doubt at the present time.

New York. June 1.

Pig Iron.—The market is very dull, with only small buying. Some large lots are under negotiation for delivery after July, but buyers are in no hurry to close. Prices are a shade lower all around. For northern iron we quote: No. 1 X foundry, $15@$15.25; No. 2 X, $14.25@ $14.75; No. 2 plain, $13.75@$14.25; gray forge, $13.25@$13.50. For southern iron on dock, prices are about as follows: No. 1 foundry, $13.50@$13.75; No. 2 foundry, $13@$13.25; No. 3 foundry, $12.75@$13; gray forge, $12.25@ $12.50; No. 1 soft, $13.25@$13.50; No. 2 soft, $12.75@$13. Some southern is said to be pressed for sale.

Bar Iron and Steel.—The trade continues quiet. Refined bars are quoted at 1.495c., in large lots, with steel at the same figure. Common iron bars can be had for 1.35c. Concessions are reported on some large orders.

Structural Material.—The market remains dull, and only small orders are noted. Large lots at tide-water are still quoted nominally at 1.75@2c. for beams, angles and channels. Probably these prices could be shaded on a good order.

Plates.—The market is dull, with orders confined to small lots. Sheared plates are quoted as follows: Tank, 1.25-in. and heavier, 1.75@ 1.85c.; flange, 1.85@2c.; marine, 2@2.10c. It is locally reported that the United States Steel Corporation has taken orders for plates for export at rates that work out about 1c. at mill. It is impossible to verify these reports.

Steel Rails.—Nothing is doing in standard rails, but there is some inquiry for girder rails for electric roads. Quotations remain $28 for standard sections, f. o. b. mills. Light rails are quoted f. o. b. eastern Pennsylvania mills, as follows: 12-lb., $27; 20-lb., 25-lb., 30-lb., and 35-lb., $25; 40-lb. and 45-lb., $24.

Philadelphia. June 2.

(From Our Special Correspondent.)

Pig Iron.—Conditions are less favorable than a week ago. While iron is not quotably lower, except on private inquiry, it is worth less, and in a limited way is selling for less money. The few large deals which were to have gone through this week are off for the present, and our leading agents and brokers are trying to give a reasonable explanation for the present dullness, when activity was supposed to be assured. Southern iron-makers are still capturing some business by bold strokes. Eastern and middle Pennsylvania productive capacity will be still further restricted. Despite all the unfavorable features, our people talk hopefully for business during the last half of the year. Quotations are unsettled, but business is being done on a moderate scale at $15.25 for No. 14 foundry; $15 for No. 24; $14 for No. 2 plain; the same for Alabama No. 2; gray forge is $13.50; basic is nominally $14.

Steel Billets.—The sliding scale that practically prevails renders quotations meaningless. Mills are gathering up business in this territory though only nearby requirements are being provided for. Quotations range from $24 to $25.

Nails.—A good demand for nails is now in progress. Much building is being undertaken.

Merchant Steel.—Crucible steel and shafting have been selling better of late, and agents are now about closing up some satisfactory business.

Plates.—Steel plate for minor purposes, including a few lots of ¼-in. tank, have been ordered for quick local delivery. The plate iron outlook is not particularly bright.

Structural Material.—A number of local requirements for building purposes and small bridge work are coming along, but no big business has shown up.

Pittsburg. May 31.

(From Our Special Correspondent.)

There is but little change in the pig iron market. Some orders have been placed during the week on recent inquiries for forge and foundry iron. Under present conditions an order, no matter how small, is considered important. The sale on Friday of 1,600 tons of southern foundry iron by a Pittsburg concern at $9.25, Birmingham, and a few lots of forge iron together with several inquiries, including one for 12,000 tons of foundry, and a number of others, aggregating about 75,000 tons, are responsible for the report here that the pig iron trade is improving. During a brisk period no notice would be taken of these transactions. A week ago a dealer sold 500 tons of forge iron, and in making the announcement said he believed two other sales for like amounts had been closed. It was promptly reported that a sale of 1,500 tons of forge iron had been made, and there was every indication that an active buying movement had started. The Westinghouse interests are in the market for foundry iron, and may close a contract this week for about 2,000 tons. Other inquiries likely will be acted upon this week, and indications are that more business will be done than for several weeks. There is nothing doing in bessemer iron and the furnaces are still working on old orders. The movement started by the National Association of Blast Furnace Workers & Smelters for an increase in wages on June 1 has been abandoned. It is given out that fully one-half of the merchant furnaces in the Mahoning and Shenango valleys will be blown out by July 1. The rest will continue to operate if new business is received.

All the iron and steel plants in the Pittsburg district are in operation, although some of them are not running full. There seems to be enough business to keep them going until July 1 at least. On that date it is confidenty believed a number will be closed for a period. The Jones & Laughlin Steel Co., the largest independent concern in the district, is running its plants in full, and has enough business on the books to keep them going for several months. The 1,700 coke ovens of this company near the Eliza blast furnaces

were closed for three days last week, owing to a strike of the workers for an advance in wages. The demand was withdrawn and all returned to work on Friday. The company was not inconvenienced by the suspension. The Carnegie Steel Co. now has control of the plant of the Clairton Steel Co. and operations will not be suspended as had been reported. The company had some good orders on its books when taken over by the United States Steel Corporation. There is now no doubt as to shading of prices in billets, merchant pipe, plates and wire and a readjustment of prices is expected to be made to conform to existing conditions. Some large sales of tin-plate are reported, but the American Sheet & Tin-Plate Co. still has big stocks on hand and is able to meet all orders. It is reported that the company intends to close a number of its union works on July 1 to install the Bray semi-continuous process.

It was officially announced during the week that the convention of the Amalgamated Association of Iron, Steel & Tin Workers had voted to cancel the rebate tin-plate agreement. It also decided to ask for a restoration of part of the 18% reduction in the wage scale recently authorized by the expanded conference. The conference committee was authorized to accept a cut of 10% from the scale of 1903-04. Similar action on the sheet scale was taken, and there is likely to be trouble when the conferences are held with the manufacturers. There is considerable dissension in the workers' organization. The declaring open of non-union mills under certain conditions is taken as an evidence of weakness, and it is considered doubtful if any of the demands decided upon by the convention can be enforced. President T. J. Shaffer had a narrow escape from defeat for re-election. The first ballot was: Shaffer, 95; Tighe, 55, and McArdle, 50. The second ballot resulted in Shaffer getting 110 and Tighe 90 votes.

Pig Iron.—There is nothing doing in bessemer pig iron and is still quoted at $12.50, Valley furnaces. A Pittsburg interest sold 1,600 tons of southern foundry No. 2 at about $9.75, Birmingham. Northern foundry is quoted at $13.25, Pittsburg, but it is believed this rate could be shaded. Gray forge is quoted at $12.50@$12.75, Pittsburg, and a sale of 500 tons was made during the week at the latter figure.

Cartagena, Spain. May 14.

(Special Report of Barrington & Holt.)

Iron and Manganiferous Ores.—Shipments for the week were one cargo, 2,400 tons dry ore to Glasgow.

There has been no material alteration in the local iron ore trade. Although freight rates remain very low, shipments have been very sluggish. The little business reported is at prices similar to last sales.

Current quotations for iron ore are: Ordinary 50% ore, 6s, 6d@6s. 9d.; special low phosphorus, 7s.@7s. 6d.; specular ore, 58% iron, 9s.; magnetic ore, 60%, 11s. 3d. for lumps and 9s. 3d. for smalls. Manganiferous ores range from 14s. 3d. for 20% iron and 20% manganese down to 9s. 6d. for 35% iron and 12% manganese.

Pyrites.—Iron pyrites, 40% iron and 43% sulphur, are quoted at 10s. 3d. per ton.

Other Exports.—These include 50 tons ocher to London.

CHEMICALS AND MINERALS.

NEW YORK, June 1.

The intervention of Decoration Day has accentuated the quiet that has come over the market, and the little business doing is wholly on running contracts. Prices show little change. Tin crystals are lower at 17c. per lb. in barrels, 17.5c. in kegs, and 18.5c. in jars.

A dividend of 30% on the ordinary shares has been declared by Brunner, Mond & Co. for the year ending March 31, 1904; in addition £150,000 has been placed to the reserve fund, and £34,000 carried forward.

During the four months ending April 30 there was exported from New York, principally to Mexico, the West Indies and South America, 1,123,722 lb. bicarb. soda, and 897,624 lb. caustic soda, while 25,733 bbl. zinc oxide went chiefly to Great Britain and France.

Cyanide.—Quiet at 19@20c. per pound.

Bleaching Powder.—Further job sales are reported at $1.10@$1.125 per 100 lb. First hands continue to quote contracts at $1.20@$1.25, according to brand.

Copper Sulphate.—Inquiries for forward shipment are answered by the quotation of $5.05@$5.10 per 100 lb. Business, however, is slack.

Acids.—There is no complaint at deliveries on contract, and prices are firm.

We quote as below per 100 lb., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Muriatic, 18°	$1.50	Oxalic, com'l.	$5.10@$5.50
Muriatic, 20°	1.60	Sulphuric, 50°, bulk, ton	13.50@14.50
Muriatic, 22°	1.75	Sulphuric, 60°, 1.05 bulk, ton	18.00@20.00
Nitric, 36°	4.50	Sulphuric, 66°, 1.20 bulk, ton	21.00@23.00
Nitric, 38°	4.75		
Nitric, 40°	5.00		
Nitric, 42°	5.50		

Brimstone.—Small sales on spot are noted at $22.25@$22.50 per ton, while shipments are $22@$22.25 for best unmixed seconds. Thirds are nominally 50c. less.

Pyrites.—Demand is slow, although prices are stationary.

We quote domestic pyrites $5 per ton for lump ore, f. o. b. Atlantic coast mines, and 9c. per unit for fines; sulphur content varies from 42@44%. Spanish pyrites, carrying from 46@52% sulphur, are quoted at 11@11.5c. per unit for lump, and 9.5@10c. for fines, delivered at Atlantic ports.

Nitrate of Soda.—Spot prices are now $2.20@$2.25 per 100 lb., and futures $2.075@$2.15, according to position.

Exports in the fourth year of the combination—April 1, 1904, to March 31, 1904—will be based on 36,000,000 qtl. This is 3,500,000 qtl. more than the previous year's quota, and is 4,073,749 qtl. more than the world's consumption in 1903-4. The increase in the 1904-5 exports has been made necessary by the influx of new producers, the older ones being obliged to stand a further reduction of about 3% in their quota. It is likely, though, that the present estimate will be revised in July, as has been the custom in past years.

The annual reports of the *oficinas* for 1903 are now being published, and it is interesting to note that all show substantial net profits, equivalent in some cases to 11.5@20.5d. per qtl. ($5.06@$9.02 per long ton) on the exports. Good dividends have been declared, and the reserve funds liberally added to.

Chilean Nitrate of Soda Market.—Messrs. Jackson Bros., of Valparaiso, write, under date of April 30, that there has been a steady demand for 95% April-July delivery, transactions being made at gradually advancing prices from 6s. 10d. to 6s. 11d. alongside; business was also effected in monthly parcels, July to December shipment, at 6s. 9½d. to 6s. 11d. alongside, and a sale is reported of 1,500 tons monthly for the whole of 1905 at 6s. 6d., steamer terms. For the refined quality there has been less demand, but some parcels July-December delivery, have been disposed of at 7s. 3d. alongside. The production in the three months ending March 31 was 6,331,000 qtls., against 6,935,000 qtl. last year; exports, 6,794,000 qtl., against 5,596,000 qtl.; consumption, 12,550,000 qtl., against 11,532,000 qtl. The market closed quieter, and we quote 95%, April-May, 6s. 11½d., and June-December, 6s. 11d. sellers'; 96% is held for 7s. 5d., April-May; 7s. 3½d., June-July delivery. The price of 6s. 11½d. with an all-rfound freight of 17s. 6d. stands in 8s. 7¾d. per cwt. net cost and freight, without purchasing commission. Sales for the fortnight were 1,102,200 qtl., and re-sales, 198,000 qtl.

Sulphate of Ammonia.—Inactive. Quotations are $2.975@$3.05 per 100 lb. for gas liquor, according to time of delivery.

Phosphates.—Foreign trade in land pebble shows an appreciable increase this year, about 100%, which, by the way, fully makes up for the depreciation in the hard-rock shipments from Florida. It is noteworthy that in four months this year the exports of land pebble to Germany alone, amounting to 33,800 tons, were 5,860 tons larger than the quantity reported in the whole year 1903. The shipments to France have also greatly improved, and at the present monthly rate of increase the land pebble exports this year should establish a record. Florida hard-rock exports are about 9% less than last ye r, owing chiefly to the greatly reduced purchases for Germany and Holland, where the low price of superphosphates has rather discouraged buying of expensive raw material. Domestic shipments of Peace River pebble are expanding, but as the miners are also consumers, the phosphate market is little concerned.

Shipments from Florida in April and the four months this and last year were as below, in long tons:

	April.	Four months. 1904.	1903.
Hard rock	44,936	146,303	160,741
Land pebble	31,495	127,820	79,82
Peace River	2,680	18,440	9,845
Total	79,111	292,572	250,409

The increase of 42,163 tons, or 16.9% in the shipments for the four months this year, is explained by the following:

	Exports. 1903.	1904.	Domestic. 1903.	1904.
Hard rock	160,741	146,303	....	....
Land pebble	41,320	82,580	38,503	45,249
Peace River	.....	.....	9,845	18,440
Total	202,061	228,883	48,348	63,689

Exports, it will be seen, show an increase of 26,822 tons, or 13.2%, and constitute over 78% of the total shipments from the State. Most of the exports were for Germany, France and Great Britain.

It is learned that the acid phosphate branch of the Dunnellon-Buttgenbach affiliation, to be quartered at Inglis, Fla., will be operated under the name of the Barker Chemical Co., which has been organized with a capital of $500,000. Details of the new project were given in the JOURNAL of May 5.

In Tennessee there is increased activity noticeable around Mount Pleasant, and the shipments from this quarter this year will be very large. Exports through Pensacola in the four months ending April 30, principally to France and Italy, are reported at 31,642 tons.

South Carolina, particularly around Charleston, demand for phosphate rock, shows improvement. Still the decadence of the river mining industry has rather discouraged miners. Hope is now centered in the successful working of the marshes, where large quantities of good phosphate is visible.

Phosphates.	F. o. b.	C. i. f. Gt. Britain or Europe.
*Fla. hard rock, 77@80%	$7.00@$7.25	$10.07@11.63
land pebble, 68@73%	3.75@ 4.00	7.35@ 8.05
†Tenn. 78@80%	4.00@ 4.25	9.88@10.66
78%	3.75@ 4.00	.....
75%	3.25@ 3.50	.....
73@74%	2.95@ 3.20	.....
‡So. Car. land rock	3.00@ 3.25	.....
river rock, 55@60%	2.75@ 3.00	5.75@ 6.56
Algerian 63@70%	....	6.82@ 7.32
58@63%	....	6.05@ 6.50
53@58%	....	4.95@ 5.00
Tunis (Gafsa)	....	5.75@ 6.50
Christmas Isle, 80@85%	....	11.75@12.54
Ocean Isle, 82@88%	....	12.54@12.98
Somme, Fr., 70@75%	....	10.63@11.02
Bordeaux, Fr., 60@65%	....	7.60@ 7.72
55@60%	....	6.44@ 6.55
Liege, Bel., 60@65%	....	7.00@ 7.10

* F. o. b. Florida or Georgia ports. † F. o. b. Mt. Pleasant. ‡On vessel, Ashley River, S. C.

Liverpool. May 18.

(Special Report of Joseph P. Brunner & Co.)

There is a fair export trade passing in most of the ordinary lines of heavy chemicals.

Soda ash demand is fairly good. For tierces, nearest spot range is as follows: Leblanc ash, 48%, £5@£5 10s.; 58%, £5 10s.@£6 per ton net cash. Ammonia ash, 48%, £4 5s.@£4 10s.; 58%, £4 10s.@£4 15s. Bags, 5s. per ton under price for tierces.

Soda crystals are in good jobbing demand at generally £3 7s. 6d. per ton, less 5% for barrels, or 7s. less for bags, with special terms for a few favored markets.

Caustic soda is in request and prices are firm: 60%, £8 15s.; 70%, £9 15s.; 74%, £10 5s.; 76%, £10 10s. per ton net cash. Special quotations for export to the Continent and a few other export quarters.

Bleaching powder is dull and dragging, although unchanged in price, hardwood being

quoted at £4 5s.@£4 10s. per ton, net cash, as to market.

Chlorate of potash is in better demand at the advanced figures of 2⅞d.@3d. per lb., net cash.

Bicarbonate of soda is selling at £6 15s. per ton, less 2½% for the finest quality in 1 cwt. kegs, with usual allowances for larger packages, also special terms for a few favored markets.

Sulphate of ammonia is without improvement and prices are easy at about £12 2s. 6d.@£12 5s. per ton, less 2½% for good gray, 24@25% in double bags f. o. b. here.

Nitrate of soda is a shade easier owing to heavy arrivals this week, and is now quoted on spot at £10 7s. 6d.@£10 10s. per ton, less 2½% for double bags f. o. b. here, as to quality.

METAL MARKET.

New York, June 1.

Gold and Silver Exports and Imports,

At all United States Ports in April and Year.

Metal	April		Year.	
	1903.	1904.	1903.	1904.
Gold:				
Exports.	$1,705,488	$19,473,857	$4,340,385	$23,861,296
Imports.	1,349,621	10,289,839	9,745,656	32,405,409
Excess	I. $355,845	I. $9,183,788	I. $5,405,271	I. $ 8,544,213
Silver:				
Exports.	2,891,472	3,707,206	13,800,517	16,371,225
Imports.	1,857,574	2,215,436	6,317,908	9,039,839
Excess	E. $1,033,898	E. $1,491,770	E. $7,482,609	E. $7,331,386

These exports and imports cover the totals at all United States ports. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Exports and Imports, New York.

For the week ending May 28 and for years from January 1.

Period.	Gold.		Silver.	
	Exports.	Imports.	Exports.	Imports.
Week	$2,801,082	$725,915	$977,000	$2,404
1904	62,855,610	2,745,767	17,199,192	331,666
1903	8,195,823	2,890,846	7,258,965	938,939
1902	16,462,165	1,088,076	12,543,057	497,249

The gold exports went to France and the silver to London. Most of the gold imported was in foreign coin from France and Germany.

General business continues rather quiet; in fact most departments are dull. About $5,000,000 more in gold have been taken for export since our last report.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison is made with the holdings at the corresponding date last year:

	1903.		1904.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'd—	$164,005,300	.....	$223,275,400	.....
England—	179,248,130	.....	163,401,690	.....
France—	500,251,870	$223,428,710	547,035,530	$225,080,590
Germany—	175,270,000	61,580,000	179,590,000	63,100,000
Spain—	72,580,000	101,920,000	73,580,000	100,275,000
Netherlands—	17,700,000	32,822,000	27,378,500	32,940,000
Belgium—	15,423,335	7,711,665	15,433,335	7,716,665
Italy—	89,595,000	11,317,000	110,485,000	20,015,500
Russia—	387,880,000	44,415,000	421,975,000	41,395,000
Austria—	230,625,000	65,755,000	236,045,000	63,875,000

The returns of the Associated Banks of New York are of date of May 28, and the others May 26, as reported by the *Commercial and Financial Chronicle* cable. The New York bank do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

The statement of the New York banks—including the 56 banks represented in the Clearing House—for the week ending May 28, gives the following totals, comparison being made with the corresponding week of 1903:

	1903.	1904.
Loans and discounts	$922,975,900	$1,040,483,400
Deposits	913,081,800	1,098,953,500
Circulation	44,173,300	37,001,600
Specie	164,005,800	223,275,400
Legal tenders	73,909,800	81,155,300
Total reserve	$237,915,600	$304,430,700
Legal requirements	228,270,450	274,738,775
Balance surplus	$9,645,150	$29,692,325

Silver has been quiet and orders have been limited. The market has declined ¼d. this week, but there is no great pressure to sell, and the situation indicates rather a steadier tone to-day.

The United States Assay Office in New York reports receipts of 32,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to May 19, are reported by Messrs. Pixley & Abell's circular as follows:

	1903.	1904.	Changes.
India	£2,839,125	£4,526,153	I. £1,687,028
China	168,156	126,062	D. 42,094
Straits	186,079	58,103	D. 127,976
Total	£3,193,360	£4,710,318	I. £1,516,958

Receipts for the week were £90,000 in bar silver from New York, £12,000 from the West Indies, £4,000 from Chile, and £5,000 from Australia; also £5,000 in Mexican dollars from Hong Kong; total, £116,000. Shipments were £131,000 in bar silver to Bombay, and £25,281 in coin to Hong Kong; total, £156,281.

Indian exchange has been firm, the Council bills offered in London being all taken at 16.03d. per rupee. The demand for currency in India continues large. Silver purchasers for the Indian Council have not, however, materialized to any considerable extent, and no silver has been taken in London for Japanese account.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	$0.44¼	$0.46½
Peruvian soles and Chinese pesos	.40	.43¾
Victoria sovereigns	4.86	4.87
Twenty francs	3.86	3.88
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

May-June.	Copper. Lake, Cts. per lb.	Copper. Electrolytic, Cts. per lb.	Copper. Cathodes, Cts. per lb	Copper. London, £ per ton.	Tin, Cts. per lb.	Lead, Cts. per lb.	Spelter. N. Y., Cts. per lb.	Spelter. St. Louis, Cts. per lb.
26	12¾ @12⅞	12⅛ @12⅜	12¼ @12⅜	56⅛	27⅛ @27⅜	4.30 @4 35	4.80 @4.85	4.60 4.62½
27	12¾ @12⅞	12⅛ @12⅜	12¼ @12⅜	56⅜	27⅛ @27⅜	4.20 @4.25	4.80	4.60
28	12¾ @12⅞	12⅛ @12⅜	12¼ @12⅜	....	27⅜ @27¼	4.20 @4.25	4.75 @4.80	4.55 @4 60
30	.....	.....	.....	56¼	....	.....	.....	.....
31	12¾ @12⅞	12⅛ @12⅜	12¼ @12⅜	56⅜	27⅛ @27¼	4.20 @4.25	4.75 @4.80	4.55 @4.60
1	12¾ @12⅞	12⅛ @12⅜	12¼ @12⅜	56⅜	27⅛	4.20 @4 25	4.75 @4.80	4.55 @4.60

London quotations are per long ton (2,240 lb.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wire-bars.

SILVER AND STERLING EXCHANGE.

May.	Sterling Exchange.	Silver. New York, Cts.	Silver. London, Pence.	May-June.	Sterling Exchange.	Silver. New York, Cts.	Silver. London, Pence.
26	4.87	55⅞	25¾	30	.....	.....	25⅝
27	4.87¼	55¾	25 11/16	31	4.87⅛	55	25⅝
28	4.87⅛	55¾	25 11/16	1	4.87⅛	55	25⅝

New York quotations are for fine silver per ounce Troy London prices for sterling silver, .925 fine.

Copper.—There has been very little change in the market, which has ruled rather quiet. Orders for domestic consumption are still lacking, but there has been quite a revival in the inquiry from abroad, resulting in fairly large transactions, though at somewhat lower prices than have previously been accepted. Consumption abroad remains on a very heavy scale, as is evidenced by the fact that exports continue very large indeed, those for the month of May approaching 15,000 tons, and the information we have gathered would indicate that all of this copper, as fast as it reaches the seaports on the other side, is shipped immediately to the manufacturing centers on the Continent. We quote prices as follows: 12¾@12⅞c. for lake; 12½@12⅝c. for electrolytic in ingots, cakes and wirebars; 12¼@12⅜c. in cathodes; 12⅛@12⅜c. for casting copper.

Standard copper in London, which closed last Wednesday at £56 10s. opened on Thursday at £56 5s., advanced subsequently to £57, but did not maintain the improvement, the closing prices to-day being £56 12s. 6d. for spot, £56 12s. 6d. for three months.

Statistics for the second half of May show a decrease in the visible supplies of 800 tons.

Refined and manufactured sorts we quote: English tough, £60@£60 10s.; best selected, £61@£61 5s.; strong sheets, £72; India sheets, £67 10s.@£68; yellow metal, 6⅛d.

Exports of copper from Baltimore for the week ending May 31 are reported by our special correspondent as 1.076 tons, all to Holland. Imports were 268 tons copper from Great Britain.

Exports of copper in all forms from the United States, for the four months ending April 30, are reported by the Bureau of Statistics of the Department of Commerce and Labor as below; the figures given are in long tons:

	1903.	1904.	Changes.
Copper, ingots, etc.	46,519	83,702	I. 37,183
Ores and matte	3,004	6,708	I. 3,704

The exports of fine copper this year show an increase of 80%. The report does not separate ores and matte. Estimating their copper contents on the basis of values, we find that the total fine copper in all exports, for the four months, was approximately equal to 85,837 long tons of fine copper.

Imports of copper into the United States, in all forms, with re-exports of foreign material, in the four months ending April 30, are reported by the Bureau of Statistics as below, in long tons:

Fine copper:	1903.	1904.	Changes.
Imports	18,229	21,161	I. 2,932
Re-exports	1,016	50	D. 966
Net imports	17,213	21,111	I. 3,898
Ores and matte:			
Imports	85,124	98,926	I. 13,802
Re-exports	2,814	.....	D. 2,814
Net imports	82,310	98,926	I. 16,616

The contents in copper of the ores and matte imported this year are given at 4,474 long tons. This makes the total net imports of copper, in all forms, this year equal to 25,585 tons of fine copper.

Of the imports this year, 15,952 tons fine copper and 23,295 tons ore and matte, containing 2,248 tons of copper—18,200 tons of metal in all—came from Mexico; 2,429 tons fine copper and 71,294 tons of ore and matte, containing 2,359 tons copper—4,788 tons of metal in all—were from Canada. These two countries furnished 89.8% of the total imports.

Tin has had a severe decline, the price for spot at the close being 27c. and for futures 26¾c.

The London market, which closed last week at £124 for spot, £123 10s. for three months, has declined since to £122 5s. for spot, £121 15s. for three months.

Statistics for the month of May show an increase in the visible supplies of 1,400 tons.

Imports of tin into the United States, for the four months ending April 30, are reported as follows, in long tons of 2,240 lb.:

	1903.	1904.	Changes.
Straits	7,605	5,890	D. 1,715
Australia	87	90	I. 3
Great Britain	6,290	6,974	I. 684
Holland	375	289	D. 86
Other Europe	178	165	D. 13
Other countries	22	7	D. 15
Totals	14,557	13,415	D. 1,142

The decrease in imports this year was 7.8%. Most of the tin received through Great Britain is Straits tin, so that the larger part of our supply is in that brand.

Lead.—The American Smelting & Refining Co. has made a further reduction of $2 in their official price for lead on May 24. It appears that these reductions are being instituted on account of a falling off in the demand, and an increase in the supplies, resulting in a surplus, which, however, may prove of only a temporary nature. The closing quotations are 4.20@4.25 New York, 4.125@4.17½ St. Louis.

The London market has suffered a further decline, Spanish lead being now quoted £11 7s. 6d.@£11 8s. 9d.; English lead, £11 10s.@£11 12s. 6d.

Imports of lead into the United States, with re-exports of foreign lead, for the four months ending April 30, are reported by the Bureau of Statistics as below. The figures given are in short tons:

	1903.	1904.	Changes.
Lead, metallic	122	4,609	I. 4,487
Lead in ore and base bullion	33,252	32,696	D. 556
Total imports	33,374	37,305	I. 3,931
Re-exports	22,888	27,883	I. 4,995
Net imports	10,486	9,442	D. 1,064

Of the imports this year, 34,750 tons were from Mexico, and 1,806 tons from Canada. In addition to the re-exports, there were 146 tons of domestic lead exported this year, against 42 tons last year.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of May 14, that the price of silver during the week has been 14 reales per ounce. The exchange remains at 34.94 pesetas to £1. The local quotation for pig lead has been 67.50 reales per quintal, which on above exchange is equal to £10 16s. 2d. per ton of 2,240 lb., f. o. b. Cartagena. Exports have been 600,000 kg. to London; 200,000 kg. desilverized lead and 1,205 kg. silver bars to Marseilles.

Spelter.—The market is rather demoralized, the decline not having come to a halt as yet. Offerings continue to be more plentiful than the demand, which is very slack, and the closing quotations are 4.75@4.80 at New York, 4.55@4.60 at St. Louis.

The London market is unchanged at £22@£22 5s. for good ordinaries; £22 5s. for specials.

Exports of spelter, or metallic zinc, from the United States for the four months ending April 30 were 744 short tons, against 947 tons in the corresponding period in 1903; a decrease of 203 tons. Exports of zinc ore were 10,226 tons, against 15,251 tons in 1903; a decrease of 5,025 tons this year.

The Lanyon Zinc Co. has given notice of a reduction of 10c. per 100 lb. on sheet zinc, making the new base price $6 per 100 lb., f. o. b. mill.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of May 14, that prices are firm and ore is being delivered as fast as mined. Blende, 35% zinc, is quoted at 68 fr.; calamine, 30% zinc, 47 fr. per ton.

Antimony is without change. Cookson's is quoted at 7@7½c.; Hallett's, 6⅜@6½c.; all other brands at 6@6⅛c.

Imports of antimony into the United States, for the four months ending April 30, are reported as follows, in pounds:

	1903.	1904.	Changes.
Metal and regulus	1,974,075	1,198,878	D. 775,197
Antimony ore	1,725,442	1,402,680	D. 322,762

This shows a decrease of 39.3% in metal; also a decrease of 18.7% in ore imported.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

Exports of nickel, nickel oxide and nickel matte from the United States for the four months ending April 30 were 1,095,458 lb., against 872,448 lb. in the corresponding period in 1903; an increase of 223,010 lb. this year.

Platinum.—Quotations are nominally $18.50 per ounce, but the tendency is upward, and higher prices are expected.

Platinum in manufactured forms is very firm. Messrs. Eimer & Amend, of New York, quote for different forms as follows: Heavy sheet and rod, 75c. per gram; foil and wire, 77c.; crucibles and dishes, 80c.; perforated ware, like cones, etc., 85c. per gram.

Imports of platinum into the United States for the four months ending April 30 were 2,339 lb., against 3,242 lb. in the corresponding period in 1903; a decrease of 903 lb. this year.

Quicksilver.—The New York price is slightly easier at $44.50@$45 per flask, for large lots, with a slightly higher figure quoted for smaller orders. The San Francisco quotations are also somewhat easier, the current price being $43@$43.50 for domestic, and $42.50@$43 for export. The London price is £8 2s. 6d. per flask, with the same figure named by second hands.

Exports of quicksilver from the United States for the four months ending April 30 were 820,280 lb., against 413,908 lb. in the corresponding period in 1903; an increase of 406,372 lb. this year.

Cadmium.—Current prices, as reported by Herr Paul Speier, of Breslau, Germany, are as follows: Cadmium, guaranteed, 99.5% metal, in quantities of 500 kg. or over, 700@725 marks per 100 kg., f. o. b. Hamburg, net cash, packing included.

Minor Metals and Alloys.—Thallium is quoted at 60@65 marks per kg., at Breslau, Germany. Manganese metal is quoted 360 marks per 100 kg., f. o. b. Bremen, Germany, Manganese tin alloy, 55%, is quoted 365 marks per 100 kg. for first quality, and 225 marks for second quality, both f. o. b. Bremen.

For other minor metals and their alloys, wholesale prices, f. o. b. works, are as follows:

Aluminum	Per lb		Per lb
No. 1. 99% ingots	33@37c.	Ferro-chromium (74%)	12½c.
No. 2. 90% ingots	31@34c.	Ferro-Tungsten (37%)	38c.
Rolled Sheets	4c. up	Magnesium, pure (N. Y.)	00c.
Alum-bronze	20@23c.	Manganese	$2.75
Nickel-alum	33@39c.	Mangan'e Cop. (20% Mn)	32c.
Bismuth	$2.10	Mangan'e Cop. (30% Mn)	38c.
Chromium, pure (N. Y.)	80c.	Molyb'denum (Best)	$2.00
Copper, red oxide	50c.	Phosphorus, foreign	45c.
Ferro-Molybde'm (50%)	$1.25	Phosphorus, American	70c.
Ferro-Titanium (10%)	90c.	Sodium metal	50c
Ferro-Titanium (20@25% N. Y.	55c.	Tungsten (Best)	88c.

Variations in price depend chiefly on size of order.

Missouri Ore Market. May 28.

(From Our Special Correspondent.)

The highest price of the week was $38.50 per ton, a decline of 50c. from the previous week, and a like reduction has marked nearly all grades of ore. A few bins sold as high as a $36 basis early in the week, before spelter began its toboggan downward, and later the assay was $33 to $35 per ton of 60% zinc. Lead steadied down to $56 per ton.

Following are the shipments of zinc and lead ores from the various camps of the district for the week:

	Zinc, lbs.	Lead, lb.	Value.
Joplin	2,376,900	358,310	$51,625
Webb City-Carterville	1,977,050	429,870	42,465
Duenweg	1,005,730	66,550	20,220
Galena-Empire	830,600	151,770	16,710
Granby	568,000	147,000	11,670
Alba-Neck	654,950	.....	11,460
Aurora	758,950	.....	11,035
Carthage	423,790	.....	7,415
Carl Junction	186,200	30,470	4,200
Badger	239,850	.....	4,085
Mitchell	192,460	.....	3,655
Prosperity	174,830	.....	2,885
Oronogo	93,370	11,120	1,705
Zincite	78,990	6,280	1,555
Central City	60,500	17,670	1,340
Beef Branch	14,300	36,170	885
Spurgeon-Spring City	61,680	6,300	790
Cave Springs	24,640	4,310	465
Wentworth	23,170	.....	210
Totals	9,745,970	1,265,820	$194,375
Five months this year	226,007,390	28,120,610	$4,554,520
Five months last year	207,029,770	24,345,560	4,166,520

Zinc value the past week, $159,465; five month this year, $3,765,635.

Lead value the past week, $34,910; five months this year, $788,885.

The purchasers of zinc ore shipped 530 tons less than the preceding week and about 450 tons less than the output of the week, indicating a tendency to restrict the production of spelter to hold it from declining below the cost of the production of zinc ore, as it is already evident that the ore producers are thinking strongly of restricting the output of zinc ore early this summer instead of waiting until fall, as has been the custom in past years.

By reference to the shipments in May last year it is noted that the shipments were reduced a few weeks earlier than this year, yet the price remained at $40 for the choicest bins and a basis of $35 to $37 per ton of 60% zinc. The lighter shipment of May last year was the beginning of the surplus reserve stock that worked such an injury to ore prices in October. It is hoped to prevent a recurrence of this that early action is being agitated this year.

Average Prices of Metals per lb., New York.

Mo.	Tin.		Lead.		Spelter.	
	1903.	1904.	1903.	1904.	1903.	1904.
Jan...	28.33	28.845	4.075	4.347	4.865	4.863
Feb..	29.43	28.087	4.075	4.375	5.043	4.916
Mar..	30.15	28.317	4.442	4.475	5.349	5.067
April.	29.81	2[illegible] 132	4.567	4.475	5.550	5.219
May .	29.51	27,718	4.325	4,423	5.639	5,(31
June .	28.34	.....	4.210	.....	5.697	....
July..	27.68	.....	4.075	.....	5.662	....
Aug..	28.29	.....	4.075	.....	5.725	....
Sept..	26.77	....	4.243	.....	5.680	....
Oct...	25.92	.....	4.375	.....	5.510	....
Nov..	25.42	.....	4.218	.....	5.438	....
Dec...	27.41	.....	4.162	.....	4.731	....
Year	28.09	.....	4.237	.....	5.400	....

NOTE.—The average price of spelter in St. Louis for the month of January, 1904, was 4.673c. per lb.: February, 4.717c.; March, 4.84[illegible]c.; April, 5,038c.; May, 4,853c.

Average Prices of Copper.

Mo.	New York.				London.
	Electrolytic.		Lake.		Standard.
	1903.	1904.	1903.	1904.	1903.	1904.
Jan...	12.159	12.410	12.361	12.553	53.52	57.55
Feb...	12.778	12.063	12.901	12.245	57.34	56.57
Mar..	14.416	12.299	14.572	12 551	63 85	57.321
April.	14.454	12.923	14.642	13.120	61.72	58.247
May..	14.435	12,758	14.618	13,000	61.73	57,321
June .	13.942	.....	14.212	.....	57.30	.....
July..	13 094	.....	13.341	.....	56.64	.....
Aug..	12.962	.....	13.159	.....	58.44	....
Sept..	13.205	.....	13.345	.....	56.82	.....
Oct...	12.801	.....	12.954	.....	55 60	.....
Nov..	12.617	.....	12.813	.....	56.30	.....
Dec..	11.952	.....	12,084	.....	56.36	.....
Year	13.235	.....	13.417	.....	57.97	.....

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Mo.	1902.		1903.		1904.	
	London. Pence.	N. Y., Cents.	London Pence.	N. Y., Cents.	London, Pence.	N. Y., Cents.
Jan..	25.62	55.56	21.98	47.57	26 423	57.055
Feb..	25.41	55.09	22.11	47.89	26.665	57.592
Mar..	25.00	54.23	22.49	48.72	26,164	56,741
April.	24.34	52.72	23.38	50.56	24 974	54.202
May..	23.71	51.31	24.89	54.11	25,578	55,430
June.	24.17	52.36	24.29	52.86	.....	.....
July..	24.38	52.88	24.86	53.92	.....	.....
Aug..	24.23	52.52	25.63	55.36	.....	.....
Sept..	23.88	51.52	26.75	58.00	.....	.....
Oct...	23.40	50.57	27.89	60.36	.....	.....
Nov..	22.70	49.07	27.01	58.11	.....	.....
Dec...	22.21	48.03	25.73	55.375	.....	.....
Year	24.00	52.16	24.75	53.57	.....	.....

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Company.	Latest Dividend. Payable.	Rate.	Total.	Total to date.
†C., K. & N., Colo.	May 26	.02	28,638	114,552
†Calumet & Ariz.	June 15	1.50	300,000	1,000,000
†Calumet & Hecla	June 31	10.00	1,000,000	85,350,000
†General Chem., pf.	July 1	1.50	150,000	3,025,178
Esperanza, Mex.	June 15	.25	113,750	1,267,949
Fed'l M. & S., com.	June 15	1.50	78,750	78,750
†Federal, pf.	June 15	1.75	183,750	551,250
†National Lead, pf.	June 15	1.75	260,820	14,493,808
†Standard Oil.	June 15	8.00	7,760,000	231,260,000

* Monthly. † Quarterly. ‡ Semi-annually.

ASSESSMENTS.

Company.	Delinquent.	Sale.	Amount.
Allouez, Mich.	Sept. 26	.....	1.50
Bullion, Nev.	June 24	July 14	.05
Caledonia, Nev.	May 31	June 21	.15
Con. Cal. & Va., Nev.	May 20	June 10	.25
Hale & Norcross, Nev.	May 31	June 24	.10
Lower Mammoth, Utah.	May 26	June 14	.05
Mexican, Nev.	June 13	July 7	.15
Naildriver, Utah.	June 3	June 20	.03
N. Y. Bonanza, Utah.	June 7	June 28	.03
Sierra Nevada, Nev.	June 8	June 27	.10
Skylark Copper, Utah.	June 15	July 5	.01
Utah Con., Nev.	June 6	June 27	.10
Wabash, Utah	May 23	June 14	.06
White Pine Copper, Nev.	June 10	.....	.08
Yellow Jacket, Nev.	June 10	July 13	.10

STOCK QUOTATIONS

NEW YORK.

Company.	Par val.	May 25 H.	May 25 L.	May 26 H.	May 26 L.	May 27 H.	May 27 L.	†May 28 H.	†May 28 L.	†May 30. H.	†May 30. L.	May 31 H.	May 31 L.	Sales.
Acacia, g..	$1	..	..	..	..	..	..	..	..	..	..	..	..	..
Alpha, g. s.	1	..	..	..	..	15	..	..	..	..	..	..	..	500
Amalgamated, c..	100	50¼	49⅞	51¼	50	50⅝	50¼	..	..	..	..	51	49⅜	65,075
Anaconda, c.	25	..	..	75	..	..	..	..	..	..	..	..	..	100
Belcher, s.	3	..	..	..	..	..	..	..	..	..	..	..	..	..
Best & Belcher, s..	3	..	..	..	..	..	..	..	..	..	..	..	..	..
Brunswick.	1	10	8	15	..	15	..	..	..	..	..	17	..	12,400
Caledonia, s.	1	..	..	74	..	..	..	..	..	..	..	86	..	300
Challar, s., g.	2½	..	..	19	..	..	..	..	..	..	..	..	..	200
Confidence, s.	3	..	..	..	..	1.15	1.10	..	..	..	..	..	..	500
Con. Cal. & Va., g. s.	2½	1.70	..	1.70	..	..	..	..	..	..	..	1.70	..	300
Con. Imperial.	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Creede & Cr. Ck. g	1	3	..	..	..	..	..	..	..	..	..	..	..	200
Cripple Creek, g..	1	8	..	8	..	8	..	..	..	..	..	..	..	1,800
Crown Point.	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Daly, g. s.	20	..	..	2.00	..	..	..	..	..	..	..	..	..	100
Elkton, g.	1	..	..	..	..	67	66	..	..	..	..	..	..	300
El Paso, g	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Gold Dollar	1	..	..	5	..	..	..	..	..	..	..	..	..	1,000
Gould & Carry	1	30	..	30	..	..	..	..	..	..	..	30	..	500
Greene Con., c.	10	15	14⅜	.15	14⅜	14⅜	..	..	..	..	..	14⅜	14¾	2,200
Hale & Norcross..	3	62	..	65	..	..	..	..	..	..	..	81	80	600
Homestake, g.	100	..	..	..	..	..	..	..	..	..	..	..	..	..
Iron Silver, s. b.	20	..	..	..	..	..	..	..	..	..	..	..	..	..
Isabella, g.	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Justice, s.	21	..	..	..	..	16	..	..	..	..	..	..	..	500
Mexican. s.	3	1.75	..	..	..	1.70	..	..	..	..	..	..	..	300
Mollie Gibson, g..	25	5	..	..	..	..	..	..	..	..	..	..	..	1,000
Occidental, s.	3	80	79	..	..	..	..	..	..	..	..	..	..	300
Ontario, s. l.	100	..	..	..	..	..	..	..	..	..	..	4.20	..	200
Ophir, s.	3	5.75	5.62½	5.62½	..	..	..	..	..	..	..	..	..	300
Pharmacist, g.	1	..	..	..	..	..	..	..	..	..	..	4	..	1,000
Phœnix, g.	1	..	..	..	..	..	..	..	..	..	..	14	13	2,400
Portland, g.	1	..	..	1.70	..	..	..	..	..	..	..	..	..	200
Potosi, s.	1	..	..	..	..	..	..	..	..	..	..	18	17	400
Quicksilver, Pf.	100	..	..	..	..	..	..	..	..	..	..	..	..	..
Savage, s.	3	..	..	..	..	35	34	..	..	..	..	..	..	200
Sierra Nevada, s..	3	53	..	..	..	50	..	..	..	..	..	..	..	600
Silver Hill, g. s.	1	..	..	..	..	..	..	..	..	..	..	..	..	..
StandardCon., g. s.	10	2.25	..	2.35	..	2.40	2.35	..	..	..	..	..	..	350
Tennessee, c.	25	..	..	..	..	..	..	..	..	..	..	..	..	..
Union Con., g. s.	..	..	..	..	..	..	..	..	..	..	..	..	..	300
Union Copper	10	72	..	..	..	..	..	..	..	..	..	..	..	1,300
United Copper.	100	..	..	9/16	..	⅞	9/16	..	..	..	..	..	..	..
White Knob, c.	10	..	..	..	..	..	..	..	..	..	..	7⅛	..	160
Work, g.	1	..	..	7	..	..	..	..	..	..	..	..	..	500

c—Copper. g—Gold. l—Lead. s—Silver. Total sales, 98,025 shares
†Holiday.

BOSTON, MASS.

Company.	Par val	May 25 H.	May 25 L.	May 26 H.	May 26 L.	May 27 H.	May 27 L.	†May 28 H.	†May 28 L.	†May 30 H.	†May 30 L.	May 31 H.	May 31 L.	Sales.
AdventureCon., c	$25	1⅜	....	1⅜	1⅛	1⅛	....	....	....	....	....	1⅛	....	530
Allouez, c.	25	4¼	4	5⅝	5⅜	5¼	....	....	....	....	....	5¼	....	928
†Amalgamated, c.	100	50¼	49¼	51	50⅛	50⅜	50¼	....	....	....	....	50⅜	49⅜	8,540
Am. Z. L. & Sm.	25	....	....	....	....	....	....	....	....	....	....	....	....	....
Anaconda, c. s.	25	....	....	....	....	....	....	....	....	....	....	....	....	....
Arcadian, c.	25	....	....	....	....	....	....	....	....	....	....	40	....	50
Atlantic, c.	25	....	....	....	....	....	....	....	....	....	....	....	....	....
Bingham Con.	50	21	20¾	21	....	....	....	....	....	....	....	20½	....	145
Bonanza Dev. g.	10	....	....	....	....	....	....	....	....	....	....	....	....	....
Calumet & Hecla	25	....	....	4.65	....	....	....	....	....	....	....	444	....	5
Centennial, c	25	19¼	....	19¼	....	19¼	....	....	....	....	....	....	....	213
†Central Oil.	25	9¾	9¼	....	....	....	....	....	....	....	....	....	....	20
Con. Mercur, g.	5	26	....	27	....	26	25	....	....	....	....	25	....	4,520
Copper Range	100	42¾	42¼	43⅛	42¾	43¼	43	....	....	....	....	43	42	1,080
Daly West, g. s.	20	24	23½	24	....	24	23½	....	....	....	....	24⅛	24	413
Dominion Coal.	100	....	....	64¼	64¼	64⅜	....	....	....	....	....	....	....	200
Preferred.	..	....	....	....	....	....	....	....	....	....	....	....	....	....
Dominion I. & S.	100	....	....	....	....	10½	10	....	....	....	....	10	9¼	285
Elm River, c.	12	....	....	....	....	....	....	....	....	....	....	2	....	60
Franklin, c.	25	7⅛	....	7⅛	....	7	....	....	....	....	....	....	....	81
Granby Con.	10	....	....	3½	....	....	....	....	....	....	....	3½	....	544
Guanajuato Con.	5	....	....	1⅛	1¼	1⅜	....	....	....	....	....	1⅛	....	625
Isle Royal Con.	25	6¾	....	....	....	....	....	....	....	....	....	....	....	15
Mass Con., c.	25	3 1/16	3⅛	....	....	....	....	....	....	....	....	4	....	150
Mayflower, c.	25	....	....	....	....	....	....	....	....	....	....	....	....	....
Michigan, c.	25	4	....	....	....	4	....	....	....	....	....	....	....	115
Mohawk, c.	25	....	....	40½	40	....	....	....	....	....	....	39¾	39	332
Mont. Coal & C.	25	....	....	....	....	....	....	....	....	....	....	37⅝	35¾	200
Mont'l & Boston.	5	....	....	....	....	....	....	....	....	....	....	....	....	....
New Idria, q.	5	....	....	9	....	....	....	....	....	....	....	....	....	15
Old Colony, c.	25	75	....	....	....	....	....	....	....	....	....	85	75	125
Old Dominion, c.	25	13	12¾	....	....	12½	....	....	....	....	....	12¾	....	415
Osceola, c.	25	56¾	56	57	56⅛	57	....	....	....	....	....	....	....	306
Parrot, s. c.	10	24	23¼	....	....	....	....	....	....	....	....	....	....	94
Phœnix Con, c.	25	1½	....	....	....	....	....	....	....	....	....	1⅛	....	400
Quincy, c.	25	80	....	....	....	....	....	....	....	....	....	82	80	51
Rhode Island, c.	25	....	....	....	....	....	....	....	....	....	....	....	....	....
Santa Fe, g. c	10	....	....	1¼	....	....	....	....	....	....	....	....	....	10
Shannon, c.	10	6⅝	6⅛	6⅜	6¼	6⅜	6⅛	....	....	....	....	6⅝	6¼	3,685
Tamarack, c.	25	90	....	....	....	....	....	....	....	....	....	85	....	25
Trinity, c.	25	3¾	....	....	....	4	3¾	....	....	....	....	....	....	200
Union C., T. & M.	25	....	....	....	....	....	....	....	....	....	....	....	....	....
United States, g.	10	19⅛	19⅜	20	19⅜	19⅝	....	....	....	....	....	....	....	725
U. S. Coal & Oil.	25	9⅜	9⅛	9¾	9⅛	9⅜	9⅛	....	....	....	....	....	....	660
Utah Con., g. c.	5	33¼	....	33⅜	33⅜	33⅜	....	....	....	....	....	33¾	33⅜	425
Victoria, c.	25	2¾	....	2⅝	2¼	....	....	....	....	....	....	2⅝	2¼	285
Winona, c.	25	....	....	5⅜	....	....	....	....	....	....	....	5⅜	....	15
Wolverine, c.	25	71½	70¼	70¼	....	70¼	....	....	....	....	....	71	....	64
Wyandot, c.	25	....	....	....	....	50	....	....	....	....	....	....	....	50

c—Copper g—Gold. l—Lead. q—Quicksilver. s—Silver. Total sales, 26,981 shares.
†Holiday.

COAL, IRON AND INDUSTRIAL STOCKS.

Company.	Par val.	May 25 H.	May 25 L.	May 26 H.	May 26 L.	May 27 H.	May 27 L.	†May 28 H.	†May 28 L.	†May 30 H.	†May 30 L.	May 31 H.	May 31 L.	Sale
Allis-Chalmers..	$100	7	.....	7¾	.....	7	.....	.....	.....	.....	.....	.....	.....	450
Preferred.	100	....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Agr. Chem.	100	....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....
Preferred.	100	....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Sm. & Ref.	100	50½	49⅜	51⅜	50½	52⅛	50⅞	.....	.....	.....	.....	53½	52¼	31,140
Preferred.	100	96	95¾	97	96	97	96¾	.....	.....	.....	.....	97¼	96⅜	13,060
Col. Fuel & I.	100	28⅞	.....	29⅜	29⅛	28⅝	.....	.....	.....	.....	.....	.....	.....	315
Col. & H. C. & I.	100	....	.....	....	.....	11¾	.....	.....	.....	.....	.....	.....	.....	195
Crucible Steel.	100	....	.....	....	.....	4½	.....	.....	.....	.....	.....	.....	.....	5
Preferred.	100	....	.....	36¼	.....	33½	...	.....	.....	.....	.....	36¼	.....	90
General Chem.	100	....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....
Preferred.	100	....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....
Mong. R. Coal.	50	....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....
Preferred.	50	....	.....	25½	25	....	.....	.....	.....	.....	.....	25	.....	255
National Lead.	100	19½	19	19¾	19	19¼	19	.....	.....	.....	.....	19¼	19	2,900
Preferred.	100	....	.....	91	.....	....	.....	.....	.....	.....	.....	....	.....	100
Phila. Nat. Gas.	100	38¼	.....	....	.....	....	.....	.....	.....	.....	.....	38	.....	115
Preferred.	100	....	.....	....	.....	44⅜	.....	.....	.....	.....	.....	....	.....	5
Pittsburg Coal.	100	15	14	15	.....	....	.....	.....	.....	.....	.....	14¾	.....	800
Preferred.	100	55⅝	55	55¼	55	55¼	54¾	.....	.....	.....	.....	55	.....	1,132
Republic I. & S.	100	....	.....	....	.....	6¾	.....	.....	.....	.....	.....	6¼	6¼	1,463
Preferred.	100	30	37⅞	38¼	.....	....	.....	.....	.....	.....	.....	38	37⅝	1,800
Sloss-Shef S. & I.	100	36	.....	....	.....	34	.....	.....	.....	.....	.....	....	.....	200
Preferred.	100	....	.....	....	.....	84	.....	.....	.....	.....	.....	....	.....	20
†Standard Oil.	100	616	615	616¼	615¼	618	.....	.....	.....	.....	.....	618	.....	114
Tenn. C. I. & R.R.	100	33½	34	34	.....	34	33	.....	.....	.....	.....	34¼	33½	1,950
U.S. Red. & Ref.	100	....	.....	....	.....	....	.....	.....	.....	.....	.....	....	.....	....
U.S. Steel Corp.	100	9⅛	9	9¼	9	9¼	9⅛	.....	.....	.....	.....	9⅜	9	5,570
Preferred.	100	53⅜	53	54¼	53¾	54	53⅜	.....	.....	.....	.....	54½	53¼	60,020
Va.-Car Chem.	100	27	.....	27	.....	27¼	27	.....	.....	.....	.....	26¼	.....	800
Preferred.	100	....	.....	101⅜	.....	....	.....	.....	.....	.....	.....	100	.....	245

*Pittsburg exchanges; all others, New York. Total sales, 132,839.
†Holiday.

COLORADO SPRINGS, COLO.

Company.	Par Val	May 21 H.	May 21 L.	May 23 H.	May 23 L.	May 24 H.	May 24 L.	May 25 H.	May 25 L.	May 26 H.	May 26 L.	May 27 H.	May 27 L.	Sales
Acacia.	$1	.06¾	.06¼	.07	.03	.06¾	.06¼	.07	.06¼	.07	.06	.06½	.06⅛	....
Anaconda.	5	.18	.12¼	.14½	.12½	.13	.12	.12	....	.12	....	.15	.12	1,000
Colo. City & M.	1	.02½	.02⅜	.02⅝	.02¼	.02	....	.02	....	.02⅝	.02	.02⅝	.02	1,500
C. K. & N.	1	.35	.32½	.35	.31¼	.35	.34	.35	.33½	.32	....	.35	.32	2,000
Cripple Ck. Con.	1	.08¾	.08⅛	.08¼	.08¼	.08¼	.08¾	.08¼	.08⅛	.08¼	.08	.08¾	.08¼	6,500
Des Moines.	1	.02¼	.01½	.02¼	.01½	.02¼	.01⅝	.02¼	.01½	.02⅛	.01½	.02¼	.01⅝	....
Doctor-Jack Pot.	1	.04⅞	.04¼	.04⅞	.04⅝	.05	.04⅜	.04⅜	.04⅜	.04⅝	.04⅜	.04⅝	.04⅜	51,000
Elkton Con.	1	.65	.63½	.68	.64½	.66	.65	.67	.68	.66½	.66	.66¼	.66	11,800
El Paso.	1	.84	.82	.84½	.83	.84⅛	.84¼	.85	.84¼	.87	.86¼	.86¼	.86¼	10,900
Gold Dollar Con.	1	.05	.04¾	.05	.04¾	.05	.04¾	.05	.04¾	.04⅞	.04¾	.04¾	....	4,000
Gold Sovereign.	1	.06¾	.06⅜	.06¾	.03½	.03¾	.06½	.06⅝	.06⅜	.06¾	.06¼	.06⅜	.06¼	10,600
Golden Cycle.	1	.48	.45	.48	.45	.48	.45	.45	....	.48	.45	.47	.45	1,000
Golden Fleece.	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Hart.	1	.02½	....	.02½	....	.02½	....	.02½	....	.02½	....	.02¼	....	....
Isabella.	1	.32	.30	.30⅞	.30	.32	.28	.31	.30	.30	.29	.31	.28	3,400
Jack Pot.	1	.09	.05	.09	.05	.09	.05	.09	.05	.09	....	.09	....	....
Keystone.	1	.04¾	.04¼	.04⅝	.04⅛	.04⅞	.04⅛	.04⅝	.04¼	.04⅝	.04⅛	.04⅝	.04⅛	21,000
Last Dollar.	1	.40	....	.40	....	.40	....	.40	....	.40	....	.40	....	....
Lexington.	1	.04	.03½	.04	.03⅝	.04	.03⅝	.03⅝	....	.03⅞	.03⅝	.03⅝	.03⅜	....
Little Puck.	1	.03⅛	.03⅜	.03⅞	.03⅜	.04	.03⅞	.04	.03¼	.04	.03⅞	.04	.03⅜	32,000
Mollie Gibson.	1	.07	....	.05½	.04½	.05¼	....	.05¼	....	.05½	....	.06	....	....
Moon-Anchor.	5	.09	.08	.09	.08	.09	.07	.09	.07½	.09	.08	.09	.08	....
New Haven.	5	.03	.02⅝	.03	.02⅜	.03¼	.03	.03¼	.03	.03½	.03	.03½	.03	8,000
Old Gold.	1	.08½	.08	.08¾	.07½	.08⅜	.08¼	.08¾	.08¼	.08¼	.07⅞	.08	.07½	8,000
Pharmacist.	1	.03⅞	.03⅝	.03⅞	.03½	.03⅜	.03⅜	.03¾	.03½	.03⅝	.03½	.03⅝	.03⅜	2,800
Pinnacle.	1	.03	....	.03	....	.03	....	.03	....	.03	....	.03	....	....
Portland.	1	1.77	1.70	1.75	1.70	1.75	1.71	1.75	1.68	1.75	....	1.72½	....	1,600
Vindicator Con.	1	.75	....	.75	.50	.50	....	.75	.50	.75	.50	.75	.50	....
Work.	1	.06¾	.06¾	.07¼	.06⅞	.07¼	.06¼	.07	.06¾	.06⅞	.06¾	.07	.06⅝	4,000

Total sales, 189,500 shares.

SAN FRANCISCO.

Company.	Location.	May 19 H.	May 19 L.	May 20 H.	May 20 L.	May 21 H.	May 21 L.	May 23 H.	May 23 L.	May 24 H.	May 24 L.	May 25 H.	May 25 L.	Sale
Golden Anchor.	Nev.	....	....	....	....	....	....	....	....	....	....	....	....	....
MacNamara.	Nev.	.20	.19	.20	.19	.20	.19	....	....	.18	....	.18	....	30,400
Mont. Tonopah.	Nev.	1.60	....	1.62½	1.60	....	....	1.55	....	1.57½	1.55	1.60	....	4,750
Ton. Belmont.	Nev.	....	....	.67	....	.66	.65	.65	.63	.63	.62	.63	.63	5,400
Ton. Midway.	Cal.	.38	....	.38	....	....	....	.39	.37	.37	....	.37	.36	3,200
Ton. Mg. Co.	Nev.	....	....	....	....	....	....	....	....	....	....	....	....	....
Ton. North Star.	Nev.	....	....	....	....	....	....	....	....	....	....	....	....	....
Ton. & Salt Lake	..	....	....	....	....	....	....	....	....	....	....	....	....	....

*San Francisco & Tonopah Mining Exchange.
Total sales, 43,750 shares.

COLORADO SPRINGS (By Telegraph).

Company.	May 30 H.	May 30 L.	May 31 H.	May 31 L.
Anaconda.	....	....	....	....
Cripple Ck Con.	....	....	.08⅝	.08
C. K. & N.	....	....	.33	.33
Doctor-Jack Pot.	....	....	.04⅝	.04¼
Elkton Con.	....	....	....	....
El Paso.	....	....	.86	.85½
Gold Dollar Con.	....	....	.05	.04¾
Gold Sovereign.	....	....	.06¼	.06⅛
Isabella.	....	....	.30⅜	.28¾

Company.	May 30 H.	May 30 L.	May 31 H.	May 31 L.
Jack Pot.	....	....	....	....
Last Dollar.	....	....	....	....
Mollie Gibson.	....	....	....	....
Moon Anchor.	....	....	.09¾	.07⅝
Old Gold.	....	....	.08½	.07¾
Pharmacist.	....	....	.03¾	.03⅝
Portland.	....	....	1.74	1.60
Vindicator.	....	....	.60	....
Work.	....	....	.06¾	....

SAN FRANCISCO (By Telegraph).

Company.	May †30.	May 31.
Belcher.	....	.30
Best & Belcher.	....	1.50
Caledonia.	....	.87
Challenge Con.	....	.20
Chollar.	....	.16
Confidence.	....	1.10
Con. California & Virginia.	....	1.55
Crown Point.	....	.20

Name of Company.	May †30.	May 31.
Gould & Curry.	....	.27
Hale & Norcross.	....	.75
Mexican.	....	1.50
Ophir.	....	5.37½
Overman.	....	.35
Sierra Nevada.	....	.39
Union Con.	....	.56
Yellow Jacket.	....	.19

†Holiday.

PHILADELPHIA, PA

Company.	Par val.	May 25 H.	May 25 L.	May 26 H.	May 26 L.	May 27 H.	May 27 L.	† May 28 H.	† May 28 L.	†May 30 H.	†May 30 L.	May 31 H.	May 31 L.	Sales
Am. Cement.	$10	7¾	7⅝	7¾	....	7¾	.....	.....	.....	.....	.....	.....	.....	160
Cambria Iron	50	45½	....	....	....	....	.....	.....	.....	.....	.....	.....	.....	19
Cambria Steel	50	18¾	18	18⅛	18¼	18⅛	.....	.....	.....	.....	.....	18¼	18¼	1,247
Penn. St. rf.	100	....	....	....	....	....	.....	.....	.....	.....	.....	75	.....	10
United Gas I.	50	82¼	81¼	81⅝	.....	81⅝	81⅛	.....	.....	.....	.....	81⅝	81⅜	1,017
Lehigh Nav.	50	73½	....	....	.....	....	.....	.....	.....	.....	.....	73	.....	107
Philadelphia.	50	38⅛	38	38	.....	38⅜	.....	.....	.....	.....	.....	38¾	38	614
U.S. Steel.	100	9	....	9 1/16	....	9⅛	9	.....	.....	.....	.....	9 1/16	.....	790
U.S. Steel. pf.	100	53¾	53¼	54⅛	53¾	53⅞	53⅜	.....	.....	.....	.....	54⅛	53¼	3,881

Total sales 7,845. †Holiday.

STOCK QUOTATIONS

ST. LOUIS, MO.* May 28

Name.	Par Val.	Prices. Bid.	Ask.	Name.	Par Val.	Prices. Bid.	Ask.
Am.-Nettie, Colo....	$10	$0.10	$0.30	Columbia Lead, Mo.	$10	$3.50	$4.50
Catherine Lead, Mo.	10	1.40	2.50	Con. Coal, Ill.....	100	17.00	18.00
Central Coal & C....	100	60.50	62.00	Doe Run Lead Mo.	100	110.00	115.00
Central C. & C., pf..	100	70.00	71.00	Granite Bimet. Mt..	10	.35	.40
Central Lead, Mo...	100	110.00	115.00	St. Joe Lead, Mo,..	10	14 50	15.5

*By our Special Correspondent.

SALT LAKE CITY.* May 28

Company	Par Val	High	Low	Sales.	Name of Company	Par Val	High	Low	Sales.
Ajax.....	10	.....	.....	.....	May Day.....	¼	.03⅜	.03	7,600
Bul.-Beck Tun.	1	.....	.....	.....	N. Y. Bonanza	1	⅞	¾	3,000
Butler Liberal.	1	.13½	.13	4,500	Petro.....	1	.08	.07⅞	4,000
Carisa.....	1	.07½	.07	4,200	Sacramento....	5	.07	.07	1,000
Century.....	1	.....	.23½	6,733	Silver King....	20	.14	.13⅜	4,100
Con. Mercur...	5	.29½	.....	.....	Silver Shield...	1	.01⅝	.01½	3,050
Daly.....	10	2.50	2.50	300	Star Con.....	1	.....	.....	.....
Daly Judge....	20	4.10	4.30	35	Stockton.....	1	.13¼	.10½	3,400
Daly West.....	1	23.00	23.85	735	Swansea.....	1	.35	.35	200
Grand Central.	1	4.75	4.60	500	Tetro.....	1	.30¾	.28½	5,400
Little Chief....	1	.01⅞	.01¾	15,000	Uncle Sam, Con	1	.18	.17¾	2,900
L. Mammoth..	1	.....	.....	.....	Victoria.....	1	.01⅞	.01⅝	3,000
.....	.....	.....	.....	.....	Yankee Con....	1	.32	.32	500

*By our Special Correspondent. All mines are in Utah. Total sales, 70,600 shares.

DULUTH, MINN. May 28.

Company	Par Val.	Bid.	Asked.	Company	Par Val.	Bid.	Asked.
Calumet & Arizona.....	$10	$100	$105	Lake Sup. & Pitts Dev..	$10	$145	$150
Calumet & Bisbee.....	10	3.00	4.50	Pitts. & Duluth Dev....	15	33.50	36.00
Calumet & Cochise.....	10	5.00	5.50	Shakespeare.....	10	.....	.20
Calumet & Pittsburg...	10	25.00	28.00	United Mexican.....	10	.....	.50
Higgins Development..	10	2.00	2.50	Wolverine & Arizona...	10	3.50	.....
Junction Development	15	18.00	21.00	Yaqui.....	10	.....	1.00

TORONTO, ONT. May 21

Company.	Par val	Prices. High.	Low.	Company.	Par val	Prices. High.	Low.
Black Tail, g.....	$1	.....	.....	Mountain Lion, g.....	$1	.....	.....
Cariboo-McKin.....	1	.....	.....	Payne, s. l.....	1	.13	.09
Cariboo-Hydr.....	1	.....	.....	Rambler Carib.....	1	.26	.22
Center Star, g. s.....	1	.28	.25	St. Eugene, g. s....	1	.50	.42
.....	.....	.....	.....	War Eagle Con.....	1	.14	.10
.....	.....	.....	.....	White Bear.....	1	.04½	.03½

g—Gold. l—Lead. s—Silver.

MEXICO. May 20

Company.	Shares Issued	Prices, Mex. Bid.	Ask.	Company.	Shares Issued.	Prices, Mex. Bid.	Ask.
Durango:				Trompillo.....	1,200	$1,750	$1,780
Ca. Min. de Penoles..	2,500	$3,500	$3,700	San Rafael y An., aviada.....	1,200	725	730
San Andres de la Sierra	200	10,000	.....	Soledad, aviada.....	670	705	710
Guanajuato:				Sorpresa, aviada.....	260	280	285
Angustias, Pozos....	2,400	37	40	**Mexico:**			
Cinco Senores y An., aviadoras.....	2,000	40	45	Alacran.....	2,400	20	28
Cinco Senores y An., aviada	400	33	40	Aldebarren.....	2,000	22	28
Providencia, San Juan de la Luz.....	6,000	60	65	Buen Despacho.....	3,000	38	40
Queensland y Australia	300	25	35	Dos Estrellas.....	3,000	1,750	1,780
Guerrero:				La Esperanza (El Oro.).....	3,000	1,500	1,500
Delfina, 1st serie.....	2,500	45	50	La Reformia, aviadores.....	2,000	19	20
Delfina, 2nd serie....	2,500	35	40	Santa Ana, Esperanza.....	2,400	.....	90
Garduno y Anexas...	7,200	30	40	**Michoacan:**			
Hidalgo:				Luz de Borda, aviadora.....	3,000	30	40
Amistad y Concordia	9,000	82	83	Luz de Borda, aviado.....	1,000	14	17
Carmen, aviada.....	1,100	60	90	Santiago y An., Tlal..	4,000	3	5
Guadalupe Fresnillo Mill	1,000	170	200	**Nuevo Leon:**			
Guadalupe Fresnillo Mine.....	1,400	70	80	La Fraternal.....	1,000	580	620
La Reina y An., aviadora.....	5,000	3	5	Norias de Bajan.....	1,000	880	920
Luz de Maravillas, aviadas.....	1,100	.....	20	**San Luis Potosi:**			
Maravillas y An., aviador.....	1,080	110	115	Concepcion y An.....	3,000	60	70
Maravillas el Lobo ..	1,000	130	180	El Barreno, aviadora..	2,000	60	62
Palma y An., aviador.....	1,800	8	16	Sta. Maria de la Paz..	9,800	178	182
Refugio, aviada.....	12,800	680	740	San Diegoy Annexas.	2,400	8	10
Santa Anay An., aviadora.....	1,800	50	70	**Zacatecas:**			
Santa Anay An., aviada.....	600	25	35	Asturiana y An.....	2,500	30	40
Sta. Gertrudis y An., aviadas.....	9,600	13	14	Candelaria y Pinos..	2,500	20	30
Sta. Gertrudis y An., aviadora.....	28,800	81	81½	Esperanza y An.....	2,400	6	8
Santo Tomas Apostol aviadoras.....	5,100	2	3	Lourdes.....	2,500	20	25
San Felipe de Jesus, aviadora.....	3,600	14	15	Luz de Minillas, pagadoras.....	2,000	.....	.....
San Felipe de Jesus, aviada.....	1,200	6	10	Nueva Quebradilla, aviadoras.....	2,400	25	35
San Rafael y An.,				Nueva Quebradilla, aviadas.....	600	25	30
				San Carlos y Annexas	2,500	58	62
				Sta. Maria de Gaud..	2,500	54	60
				Miscellaneous:			
				Bartolome de Medina	2,000	85	87
				Naica (Chihuahua.)..	100	11,000	13,000
				Natividad (Oaxaca) aviadora.....	1,800	950	100
				San Francisco Hac...	6,000	77	80
				Union Hacienda.....	3,000	290	300

LONDON. May 20

Company.	Shares Issued.	Par value.	Latest dividend. Amt.	Date.	Quotations. Buyers.	Sellers.
American:		£. s. d.	s. d.		£ s. d.	£ s. d.
*Alaska-Treadwell.....	240,000	5 0 0	1 6	Apr., 1904	4 12 6	4 17 6
*Anaconda.....	1,200,000	5 0 0	2 0	May, 1904	3 13 9	3 18 3
Camp Bird.....	820,000	1 0 0	9	May, 1901	1 5 0	1 7 6
Copiapo.....	112,500	2 0 0	6 10	May, 1903	17 6	1 2 6
De Lamar.....	80,000	1 0 0	1 6	May, 1904	11 3	13 6
El Oro.....	1,080,000	1 0 0	9	Jan., 1904	1 1 3	1 3 9
Frontino & Bolivia....	128,662	1 0 0	3 0	July, 1901	7 8	10 0
Le Roi.....	200,000	5 0 0	5 0	Nov., 1899	13 9	16 3
Le Roi No. 2.....	120,000	5 0 0	1 0	Feb. 1904	13 9	16 3
Montana.....	657,128	1 0 0	6	April, 1899	9	1 3
Palmarejo & Mexican...	445,000	1 0 0	rts.	April, 1903	7 9	8 3
Standard.....	500,000	4 0	2½	Sept., 1903	2 6	3 6
Stratton Independence.	1,000,007	1 0 0	6	Dec., 1903	3 6	4 0
St. John del Rey.....	546,285	1 0 0	6	Dec., 1903	11 6	12 6
Tomboy.....	300,000	1 0 0	1 0	June, 1902	1 5 0	1 10 0
Ymir.....	200,000	1 0 0	1 0	Mar., 1902	3 9	5 0
European:						
Linares.....	15,000	3 0 0	5 0	Apr., 1904	3 5 0	3 15 0
Mason & Barry	185,172	1 0 0	7 0	May, 1904	2 17 6	3 2 6
*Rio Tinto.....	325,000	5 0 0	37 6	May, 1904	50 12 6	50 17 6
*Rio Tinto, preferred...	325,000	5 0 0	2 6	May, 1904	5 17 0	6 2 0
*Tharsis.....	625,000	2 0 0	7 0	May, 1904	4 2 6	4 7 6
West Australian:						
Associated.....	495,388	1 0 0	2 0	Jan., 1904	3 5 0	3 6 3
Cosmopolitan.....	400,000	1 0 0	1 0	Apr., 1904	11 3	11 9
Golden Horseshoe.....	300,000	5 0 0	6 0	Apr., 1904	7 17 6	8 0 0
Great Boulder.....	1,750,000	2 0 0	1 0	June, 1904	1 7 3	1 7 9
Gt. Boulder Persever'ce	1,400,007	1 0 0	1 3	May, 1904	1 1 0	1 1 6
Great Fingall.....	250,000	1 0 0	7 0	Apr., 1904	8 5 0	8 7 6
Ivanhoe.....	200,000	5 0 0	7 6	Apr., 1904	8 1 3	8 3 9
Kalgurli.....	120,000	1 0 0	2 6	Apr., 1904	5 7 6	5 10 0
Lake View.....	250,000	1 0 0	rts.	Aug., 1902	1 6 3	1 8 9
Oroya-Brownhill.....	450,000	1 0 0	2 6	Mar., 1904	3 12 6	3 15 0
Miscellaneous:						
Brilliant Central.....	100,000	1 0 0	1 0	Apr., 1904	3 0 0	3 5 0
Briseis.....	600,000	1 0 0	.. ..	.....	7 9	8 3
Broken Hill.....	960,000	8 0	1 0	May, 1904	1 14 9	1 15 9
Mt. Lyell.....	275,000	3 0 0	1 3	June, 1904	13 6	14 6
Mt. Morgan.....	1,000,000	1 0 0	3	May, 1904	2 7 6	2 10 0
Waihi.....	497,412	1 0 0	4 6	June, 1904	5 17 6	6 0 0
Indian:						
Champion Reef.....	513,832	10 0	1 3	May, 1904	1 14 6	1 15 6
Mysore.....	566,043	10 0	5 6	Mar., 1904	6 8 9	6 11 3
Nundydroog.....	484,000	10 0	1 8	Mar., 1904	1 13 9	1 16 3
*Ooregum.....	343,000	10 0	1 3	Apr., 1904	1 3 9	1 6 3
*Ooregum, pfd.....	240,000	10 0	1 3	Apr., 1904	1 12 6	1 15 0
South African:						
Angelo.....	600,000	1 0 0	4 0	Feb., 1904	6 17 6	7 2 6
Bonanza.....	200,000	1 0 0	10 0	Feb., 1904	1 6 3	1 8 9
British South Africa....	4,436,019	1 0 0	rts.	May, 1899	2 2 2	2 3 1
Cape Copper.....	300,000	2 0 0	4 0	Jan., 1904	3 1 3	3 3 9
Cape Copper, pfd.....	75,000	2 0 0	1 9	Jan., 1904	2 17 6	3 2 6
City & Suburban	340,000	4 0 0	8 0	Feb., 1904	6 10 4	6 12 6
Consol. Gold-Fields....	2,000,000	1 0 0	.. ..	.....	6 16 3	6 18 9
*Crown Reef.....	120,000	1 0 0	18 0	Apr., 1904	14 5 0	14 15 0
De Beers, preferred....	800,000	2 10 0	10 0	Jan., 1904	18 8 9	18 11 3
De Beers, deferred.....	1,000,000	2 10 0	15 0	Jan., 1904	19 3 6	19 6 3
East Rand.....	930,000	1 0 0	5 0	Aug., 1903	7 18 9	8 1 3
Ferreira.....	90,000	1 0 0	3 0	May, 1904	20 15 0	21 5 0
Geldenhuis	200,000	1 0 0	6 0	Feb., 1904	5 11 3	5 13 9
Geduld.....	400,000	1 0 0	rts.	Mar., 1902	6 13 9	6 16 3
Henry Nourse.....	125,000	1 0 0	10 0	Feb., 1904	8 12 6	8 17 6
Jubilee.....	50,000	1 0 0	5 0	Feb., 1904	4 12 6	4 17 6
Jumpers.....	100,000	1 0 0	2 6	May, 1904	3 2 6	3 7 6
Langlaagte.	470,000	1 0 0	2 0	Feb., 1904	3 18 9	4 1 3
May.....	288,750	1 0 0	3 6	Feb., 1904	4 1 3	4 3 9
Meyer & Chariton.....	100,000	1 0 0	5 0	Jan., 1904	5 12 6	5 17 6
Modderfontein	290,000	1 0 0	rts.	Apr., 1902	9 10 0	9 12 6
Namaqua	94,331	2 0 0	3 0	Dec., 1903	3 5 0	3 10 0
New Jagerafontein..	200,000	5 0 0	10 0	June, 1904	28 5 0	28 15 0
New Primrose.....	325,000	1 0 0	3 0	Mar., 1904	3 16 3	3 18 9
Rand.....	1,795,956	5 0	4 0	Aug., 1902	10 13 9	10 16 3
Robinson.....	750,000	5 0 0	5 6	Feb., 1904	9 12 6	9 17 6
Robinson Deep.....	950,000	1 0 0	3 0	Jan., 1904	5 8 9	5 11 3
Rose Deep	425,000	1 0 0	2 6	Feb., 1904	8 10 0	8 15 0
Salisbury	100,000	1 0 0	2 0	June, 1904	1 17 6	2 0 0
Village.....	400,000	1 0 0	3 0	Feb., 1904	6 15 0	7 0 0
Wemmer.....	80,000	1 0 0	12 6	June, 1904	11 0 0	11 10 0

*Ex-dividend.

LONDON (By Cable.)*

Company.	May 25 £.	s.	d.	June 1 £.	s.	d.	Company.	May 25 £.	s.	d.	June 1 £.	s.	d.
Anaconda.....	3	15	0	3	15	0	El Oro.....	1	2	6	1	2	6
British So. Africa.	2	1	3	2	1	3	Modderfontein....	5	12	6	9	5	0
Camp Bird.....	1	6	3	1	8	1⅛	Rand Mines.....	10	13	9	10	12	6
Con. Gold Fields.	6	16	3	6	15	9	Rio Tinto	51	0	0	51	7	6
De Beers.....	13	2	6	13	7	6	Simmer & Jack...	1	16	3	1	14	9
East Rand.....	8	1	10	7	16	3	Tomboy.....	1	4	9	1	4	9

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

PARIS. May 19

Company.	Location.	Capital Stock.	Par value.	Latest divs.	Prices. Opening.	Closing.
		Francs.	Fr.	Fr.	Fr.	Fr.
Anzin, Coal.....	France	.....	.....	250.00	5,501.00	5,500.00
Boleo, c.....	Lower Cal....	12,000,000	500	62.50	1,985.00	1,925.00
Champ d'Or, g.....	S. Africa.....	3,375,000	25	3.75	18.50	18.50
Courrieres, Coal.....	France	600,000	500	110.00	2,841.00	2,840 00
Fraser River, g.....	Brit. Col.....	250,000	25	.....	5.50	5.50
Huanchaca, s.....	Bolivia.....	40,000,000	125	2.50	90.25	89.25
Laurium, z. l.....	Greece.....	16,300,000	500	25.00	325.00	326.00
Malfidano, z.....	Italy	12,500,000	500	50.00	595.00	593.00
Metaux, Cie. Fran. de.....	France	25,000,000	500	22.50	475.00	408.00
Mokta-el-Hadid, i. l.....	Algeria	18,312,000	500	40.00	890.00	894.00
Nickel, n.....	N. Caledonia..	15,000,000	250	22.50	580.00	553.00
Penarroya, Coal	Spain.....	.....	500	45.00	1,042.00	1,037.00
Vielle Montagne, z.....	Belgium.....	9,000,000	30	30.00	693.00	692.00
.....	.....	.....	.....	.....	.....	.....

c—Copper. g—Gold. i—Iron. l—Lead. n—Nickel. o—Oil. s—Silver. z—Zinc.

DIVIDENDS.

GOLD, SILVER, COPPER, LEAD, QUICKSILVER AND ZINC COMPANIES.—UNITED STATES.

Name and Location of Company.		Author-ized Capital Stock.	Shares. Issued.	Par Val	Dividends. Paid. 1904	Total to Date	Latest. Date.	Amt.
Acacia, g	Colo.	$1,500,000	1,433,000	$1	.....	$57,560	Apr. 1903	$0.01
Adams, s. l. c	Colo.	1,500,000	150,000	10	.....	738,500	Oct. 1902	.05
Aetna Con., q	Cal.	500,000	100,000	5	.....	325,000	Apr. 1900	.15
Alaska-Mexican, g	Alaska.	1,000,000	180,000	5	$54,000	627,381	Mar. 1904	.20
Alaska-Treadwell, g.	Alaska.	5,000,000	200,000	25	225,000	5,270,000	Apr. 1904	.37½
Amalgamated, c	Mont.	155,000,000	1,530,879	100	1,538,850	24,273,267	May. 1904	.50
Am. Sm. & R.f. com	U. S.	50,000,000	500,000	100	1,250,000	1,250,000	Apr. 1904	1.25
Am. Sm. & Ref., pf.	U. S.	50,000,000	500,000	100	1,750,000	14,141,553	Apr. 1904	1.75
Anaconda, c	Mont.	30,000,000	1,200,000	25	600,000	23,850,000	May. 1904	.50
Annie Laurie, g	Utah	5,000,000	25,000	100	75,000	350,000	May. 1904	.50
Arizona, c	Ariz.	3,775,000	.....	.....	604,786	5,333,044	May. 1904	.....
Bald Butte, g. s	Mont.	250,000	200,000	1	25,000	1,337,148	Jan. 1904	.12½
Big Six., s. l	Colo.	500,000	500,000	1	.....	17,500	Nov. 1903	.00½
Bonanza King, g	Colo.	1,000,000	1,000,000	1	5,000	5,000	Feb. 1904	.00½
Boston & Colo. Sm.	Colo.	750,000	15,000	50	.....	402,350	Oct. 1902	.75
Boston & Mont.	Mont.	3,750,000	150,000	25	300,000	28,625,000	Jan. 1904	2.00
Breece, l. s.	Colo.	5,000,000	200,000	25	.....	200,000	June. 1904	.05
Bunker Hill & Sull.	Idaho	3,000,000	300,000	10	213,000	1,735,000	May. 1904	.20
Butler-Liberal, g. s.	Utah	500,000	500,000	1	.....	2,500	Dec. 1903	.00⅛
Butte & Boston, c	Mont.	2,500,000	200,000	25	200,000	1,800,500	Feb. 1904	1.00
Calumet & Arizona, c	Ariz.	2,500,000	200,000	10	300,000	700,000	Mar. 1904	1.50
Calumet & Hecla, c.	Mich.	2,500,000	100,000	25	2,000,000	85,350,000	June. 1904	10.00
Camp Bird, g	Colo.	5,500,000	820,000	5	295,200	1,262,904	May. 1904	.18
Cashier, g	Colo.	1,000,000	920,000	1	8,340	28,180	Apr. 1904	.00½
Centennial Eureka	Utah	5,000,000	100,000	25	.....	2,667,700	Jan. 1902	.50
Center Creek, l. z.	Mo.	1,000,000	100,000	10	10,000	140,000	Apr. 1904	.10
Central Eureka, g	Cal.	4,000,000	398,425	10	35,868	271,853	Apr. 1904	.03
Central, l.	Mo.	1,000,000	10,000	100	15,000	400,000	May. 1904	.50
Century, g. s. l.	Utah	150,000	150,000	1	15,000	24,000	May. 1904	.02
Champion, c	Mich.	2,500,000	100,000	25	.....	100,000	May. 1903	1.00
C. K. & N., g	Colo.	1,500,000	1,431,900	1	14,319	85,914	Feb. 1904	.01
Clinton, g. s.	Colo.	100,000	1,000	100	.....	60,000	Dec. 1903	.30
Con. Mercur, g	Utah	5,000,000	1,000,000	5	.....	1,030,000	May. 1903	.03
Continental, z	Mo.	550,000	22,000	25	8,800	61,600	Jan. 1904	.40
Daly-West, g. s. l.	Utah	3,600,000	180,000	20	540,000	4,031,000	May. 1904	.40
De Lamar, g. s.	Idaho	400,000	67,180	5	24,184	2,784,524	May. 1904	.36
Deadwood-Stand. pf.	So. Dak	600,000	600,000	1	.....	6,000	Dec. 1903	.01
Doe Run, l	Mo.	1,500,000	15,000	100	45,000	672,072	Apr. 1904	1 50
Elkton Con., g	Colo.	3,000,000	2,500,000	1	.....	1,404,461	Mar. 1902	.04
El Paso, g	Colo.	2,500,000	2,450,000	1	85,750	182,045	May. 1904	.01
Federal Sm., pf.	Idaho	20,000,000	105,000	100	183,750	367,500	Mar. 1904	1.75
Gemini, g. s. l.	Utah	500,000	5,000	100	50,000	1,100,000	Mar. 1904	10.00
Gold Coin, g	Colo.	1,000,000	1,000,000	1	.....	1,230,000	Jan. 1903	.01
Gold King,	Colo.	1,000,000	936,850	1	14,053	473,109	Jan. 1904	.01½
Golden Cycle, g	Colo.	2,000,000	1,500,000	1	.....	303,750	Aug. 1903	.03
Good Hope, g. s	Colo.	50,000	500	100	.....	941,250	Jan. 1903	.25
Grand Central, g	Utah	250,000	250,000	1	100,000	991,250	May. 1904	.10
Gwin, g	Cal.	1,000,000	100,000	10	.....	426,500	Dec. 1902	.15
Hecla, s. l.	Idaho	250,000	1,000,000	½	30,000	150,000	May. 1904	.01
Hecla Con., s. l.	Mont.	1,500,000	30,000	50	.....	2,930,550	Apr. 1902	.25
Hercules-Horsh'e, g.	Cal.	1,000,000	340,000	1	1,420	1,420	May. 1904	.00¼
Homestake, g	So. Dak	21,840,000	218,400	100	273,000	12,640,750	May. 1904	.25
Horn Silver, g. s.c.z.l	Utah	10,000,000	400,000	25	20,000	5,382,000	Mar. 1904	.05
Internat. Nickel, pf.	U. S.	12,000,000	87,415	100	.....	349,660	May. 1903	10.00
Iowa, g. s. l.	Colo.	1,666,667	1,666,667	1	33,334	370,171	Apr. 1904	.01
Iron Silver	Colo.	10,000,000	500,000	20	150,000	3,000,000	June 1904	.10
Jamison, g	Cal.	3,900,000	390,000	10	23,400	144,300	Apr. 1904	.03
Kendall, g	Mont.	2,500,000	500,000	5	150,000	455,000	May. 1904	.05
La Fortuna, g	Ariz.	250,000	250,000	1	.....	1,092,500	Oct. 1902	.05
Last Dollar, g	Colo.	1,500,000	1,500,000	1	.....	240,000	Mar. 1903	.02
Liberty Bell, g	Colo.	700,000	130,349	1	39,104	130,337	Apr. 1904	.15
Lightner, g	Cal.	125,000	102,255	1	25,585	212,180	May. 1904	.05
Lyon, z. l.	Mo.	50,000	4,000	10	1,200	1,200	Apr. 1904	.30
Mary McKinney, g	Colo.	1,000,000	1,000,000	1	30,000	590,000	Apr. 1904	.03
May Day, g	Utah	100,000	400,000	¼	.....	30,000	Mar. 1902	.01
Mine La Mott, l.	Mo.	3,300,000	300,000	10	60,000	300,000	Jan. 1904	.20
Mines Co. of Am.	U. S.	2,000,000	2,000,000	1	125,000	580,000	May. 1904	.01¼
Modoc, g. s	Colo.	500,000	500,000	1	.....	270,000	Dec. 1903	.01
Mont. Ore Purch.	Mont.	2,500,000	81,000	25	324,000	3,618,000	Apr. 1904	4.00
Mont.-Tonopah, g	Nev.	1,000,000	885,000	1	.....	42,750	Dec. 1903	.05
Mountain, c	Cal.	6,250,000	250,000	25	.....	3,776,250	May. 1903	1.57
Napa Con., q	Cal.	700,000	100,000	7	.....	1,180,000	Oct. 1902	.10
Nat. Lead, com	U. S.	15,000,000	159,054	100	.....	1,341,486	Mar. 1900	1.00
Nat. Lead, pf.	U. S.	15,000,000	149,040	100	521,640	14,493,808	June. 1904	1.75
Nevada Keystone, g	Nev.	1,000,000	638,877	1	19,166	61,780	Feb. 1904	.03
New Century, z	Mo.	150,000	150,000	1	3,750	3,750	May. 1904	.01
New Idria, q	Cal.	500,000	100,000	5	90,000	610,000	Apr. 1904	.30
New Jersey, z	U. S.	10,000,000	100,000	10	600,000	6,600,000	May. 1904	3.00
New Lead. Home	Colo.	2,000,000	2,000,000	1	.....	265,500	Feb. 1902	.005⅛
North Star, g	Cal.	2,500,000	250,000	10	.....	706,358	Dec. 1903	.50
Northern Light, g. s.	Utah.	2,000,000	400,000	5	20,000	20,000	Feb. 1904	.05
Old Gold, g	Colo.	2,101,150	2,101,150	1	10,506	10,506	Mar. 1904	.00½
Ontario. s. l.	Utah	15,000,000	150,000	100	.....	14,917,000	Dec. 1902	.30
Ophir, g s.	Nev.	302,400	100,800	3	171,450	1,747,000	May. 1904	.50
Osceola, c	Mich.	2,500,000	96,150	25	96,150	4,343,450	Jan. 1904	1.00
Oustomah, g	Cal.	250,000	250,000	1	12,500	12,500	Mar. 1904	.05
Parrot, c	Mont.	2,300,000	229,850	10	.....	5,772,935	Jan. 1902	.02
Pennsylvania, g	Cal.	5,150,000	51,500	100	20,750	212,825	May. 1904	.10
Portland, g	Colo.	3,000,000	3,000,000	1	360,000	5,017,960	Apr. 1904	.04
Quicksilver, pf	Cal.	4,300,000	43,000	100	.....	1,931,411	May. 1903	.50
Quilp, g	Wash.	1,500,000	1,500,000	1	15,000	15,000	Apr. 1904	.01
Quincy, c	Mich.	2,500,000	100,000	25	250,000	14,370,000	Feb. 1904	2.50
Red Bird, g. s. c. l,	Mont.	1,500,000	300,000	5	.....	36,000	Dec. 1903	.01
Rob Roy, z	Mo	15,000	13,825	1	692	2,945	May. 1904	.03
Rocco Homestake, l.s	Nev.	300,000	300,000	1	4,000	94,000	Jan. 1904	.01
Sacramento, g	Utah	5,000,000	1,000,000	5	10,000	213,000	Apr. 1904	.00⅛
St. Joseph, l.	Mo	6,000,000	375,000	10	56,250	3,840,750	Mar. 1904	.15
Silver Hill, g. s.	Nev.	180,000	180,000	10	18,000	43,800	Mar. 1904	.05
Silver King, g. s. l.	Utah	3,000,000	150,000	2	600,000	7,850,000	May. 1904	.68⅛
Smuggler, s. l. z.	Colo.	1,000,000	1,000,000	5	.....	2,175,000	Feb. 1902	.01
South Swansea	Utah.	300,000	300,000	1	3,000	168,000	Apr. 1904	.01
Spearfish, g. pf.	So. Dak	1,000,888	882,000	1	4,410	101,430	May. 1904	.00½
Specie Payment, g.	Colo.	1,000,000	1,000,000	1	.....	65,190	Oct. 1903	.01
Standard Con., g. s.	Cal.	2,000,000	178,394	10	35,678	1,213,848	May. 1904	.10
Standard, c	Ariz.	500,000	500,000	1	.....	40,000	Sept. 1903	.05
Stratton's Independ.	Colo.	5,500,000	1,000,007	5	.....	4,130,960	Dec. 1903	.12½
Swansea, s. l.	Utah	500,000	100,000	5	.....	330,500	June 1902	.05
Tamarack, c	Mich.	1,500,000	60,000	25	90,000	8,580,000	Jan. 1904	1.50
Tennessee c	Tenn.	5,000,000	175,000	25	218,750	437,500	Jan. 1904	1.25
Tomboy, g. s	Colo.	15,000,000	300,000	5	.....	1,244,000	July 1902	.24
Tonopah-Alpine, g.	Nev	700,000	700,000	1	.....	70,000	Dec. 1903	.10
Town Topics, g. s.	Colo.	1,000,000	1,000,000	1	.....	50,000	Nov. 1903	.00¼
Trinity County, g.	Cal.	1,000,000	99,003	10	.....	34,561	July. 1903	.05
United, (Creede) g.	Colo.	500,000	500,000	1	10,000	55,000	Mar. 1904	.02
Union, g	Colo.	1,250,000	1,250,000	1	.....	445,244	Jan. 1903	.02
United, c. pf.	Mont.	5,000,000	50,000	100	150,000	600,000	May. 1904	3.00
United, Cripple(Ck)g.	Colo.	5,000,000	3,994,769	1	.....	319,933	Jan. 1902	.01
United, z. l., com	Mo	5,000,000	78,900	5	.....	30,725	Oct. 1903	.05
United, z. l. pf	Mo	1,000,000	18,998	25	9,499	134,855	Apr. 1904	.50
United Verde, c	Ariz.	3,000,000	300,000	10	900,000	15,980,322	Apr. 1904	.75
U. S. Red. & Ref., com	Colo.	6,000,000	59,188	100	.....	414,078	Oct. 1903	1.00
U. S. Red. & Ref., pf.	Colo.	4,000,000	39,458	100	.....	472,821	Oct. 1903	1.50
Utah, g	Utah	1,000,000	100,000	10	3,000	224,000	May. 1904	.01
Utah Con., c	Utah	1,500,000	300,000	5	450,000	2,130,000	Jan. 1904	1.50
Vindicator Con., g.	Colo.	1,500,000	1,100,000	1	33,000	1,148,000	Apr. 1904	.03
Waldorf, g.	Colo.	3,000,000	3,000,000	1	.....	47,000	July. 1903	.00¼
Wasp No. 2, g	So. Dak	500,000	147,900	1	11,832	230,242	Apr. 1904	.03
Wolverine, c	Mich.	1,500,000	60,000	25	210,000	1,530,000	Apr. 1904	3.50
Yellow Aster, g	Cal.	1,000,000	100,000	10	30,000	583,789	Feb. 1904	.15

COAL, IRON AND OTHER INDUSTRIALS.

Name and Location of Company.		Author-ized Capital Stock.	Shares. Issued.	Par Val	Dividends. Paid 1904	Total to Date.	Latest. Date.	Amt.
Ala. Con., C. & I., pf	Ala.	$2,500,000	$24,638	$100	$43,117	$732,787	Mar. 1904	$1.75
Ala. & Ga. Iron, pf.	Ala.	650,000	6,500	100	.....	6,500	Jan. 1903	1.00
Allis-Chalmers, pf.	U. S.	25,000,000	200,000	100	350,000	3,213,750	Feb. 1904	1.75
Alma Oil	Cal.	400,000	380,000	1	.....	45,600	Dec. 1903	.03
Amer. Agr. Chem., pf.	U. S.	20,000,000	181,350	100	544,050	5,214,813	Apr. 1904	3.00
American Cement	Pa.	2,100,000	200,000	10	80,000	620,000	Jan. 1904	.40
American Coal	Md.	1,500,000	50,000	25	62,500	1,495,000	Mar. 1904	1.25
Aztec Oil	Cal.	250,000	235,000	1	.....	43,050	Sept. 1903	.03
Bon Air C. & I., pf.	Tenn.	2,500,000	18,803	100	56,410	193,346	Apr. 1904	1.50
Cambria Steel	Pa.	50,000,000	900,000	50	675,000	7,125,000	Feb. 1904	.75
Central C. & C., com.	Mo.	5,125,000	51,250	100	153,750	705,600	Apr. 1904	1.50
Central C. & C., pf.	Mo.	1,875,000	18,750	100	46,874	843,746	Apr. 1904	1.25
Central Oil	W. Va.	1,500,000	60,000	25	30,000	182,500	May. 1904	.25
Colo. Fuel & I., com	Colo.	38,000,000	239,310	100	.....	1,642,500	Apr. 1902	1.75
Colo. Fuel & I., pf	Colo.	2,000,000	20,000	100	.....	1,560,000	Feb. 1903	4.00
Colum. & Hock. C.&I	Ohio.	7,000,000	99,244	100	34,622	121,153	May. 1904	.25
Consolidated Coal	Ill.	5,000,000	50,000	100	100,000	400,000	Apr. 1904	1.00
Consolidation Coal	Md.	10,250,000	102,500	100	410,000	6,946,650	Feb. 1904	4.00
Crucible Steel, pf	U. S.	25,000,000	250,000	100	.....	5,250,000	Sept. 1903	1.75
Cummings Cement	N. Y.	300,000	3,000	100	.....	216,000	July. 1903	9.00
Dabney Oil	Cal.	1,000,000	1,000,000	1	37,500	182,500	Feb. 1904	.03¾
Empire S. & I., pf	U. S.	5,000,000	23,700	100	.....	367,350	July. 1903	1.00
Fairmont Coal	W. Va.	12,000,000	120,000	100	240,000	240,000	Feb. 1904	2.00
Four Oil	Cal.	300,000	208,700	1	10,435	66,797	May. 1904	.01
General Chem., com	U. S.	12,500,000	74,103	100	.....	1,300,547	Dec. 1903	1.25
General Chem., pf.	U. S.	12,500,000	100,000	100	450,000	3,025,178	July. 1904	1.50
Giant Oil	Cal.	800,000	800,000	1	.....	144,000	Jan. 1903	.02
Higgins Oil	Tex.	2,500,000	17,609	100	.....	96,850	Apr. 1902	1.50
Home Oil	Cal.	100,000	100,000	1	2,500	495,000	May. 1904	.02½
Houston Oil, pf.	Tex.	7,500,000	75,000	100	.....	896,500	Feb. 1903	3 00
Imperial Oil	Cal.	1,000,000	100,000	100	100,000	600,000	May. 1904	.20
Int'l Acheson, pf.	N. Y.	500,000	5,000	100	.....	405,000	July. 1903	3.50
Jeff. & Cl'f. C. & I. com.	Pa.	1,500,000	15,000	100	.....	180,000	Aug. 1903	5.00
Jeff. & Cl'f. C. & I., pf.	Pa.	1,500,000	15,000	100	37,500	638,000	Feb. 1904	2 50
Lehigh Coal & Nav.	Pa.	14,346,650	286,933	50	502,133	21,543,582	May. 1904	1.75
Maryland Coal, pf.	Md.	2,000,000	18,850	50	.....	1,046,135	Dec. 1903	5 00
Monong. R. Coal, pf	Pa.	10,000,000	97,300	100	347,165	3,471,510	Jan. 1904	3.50
Monte Cristo Oil	Cal.	500,000	500,000	1	15,000	50,000	May. 1904	.01
National Carbon, pf.	U. S.	4,500,000	45,000	100	157,500	1,732,500	May. 1904	1.75
New Central Coal	Md.	1,000,000	50,000	20	20,000	270,000	Mar. 1904	.40
Ohio & Ind. Gas.	U. S.	10,000,000	900,000	100	.....	1,440,000	Dec. 1903	1.00
Oil City Petroleum	Cal.	500,000	500,00	1	7,500	7,500	June. 1904	.40½
Pacific Coast Borax	Cal.	2,000,000	19,000	100	96,000	1,630,500	May. 1904	1.00
Peerless Oil	Cal.	1,000,000	92,000	10	64,400	254,800	May. 1904	.14
Penna. Salt	Pa.	3,000,000	60,000	50	180,000	13,630,000	Apr. 1904	3 00
Penna. Steel	Pa.	25,000,000	168,214	100	588,749	4,094,499	May. 1904	3.50
Phila. Gas, com.	Pa.	28,953,029	579,041	50	797,776	4,214,607	May. 1904	.75
Phila. Gas, pf.	Pa.	5,744,813	114,896	50	143,606	1,152,673	Mar. 1904	1.25
Pittsburg Coal, pf.	Pa.	32,000,000	297,012	100	1,039,542	9,355,878	Apr. 1904	1.75
Pittsburg Oil	Cal.	300,000	240,000	1	.....	48,000	Dec. 1903	.02½
Pocahontas Coll., pf	W. Va.	1,500,000	15,000	100	37,500	227,500	May. 1904	.50
Rep. Iron & Steel, pf	U. S.	25,000,000	204,169	100	.....	6,053,476	Oct. 1903	1.75
San Joaquin Oil	Cal.	100,000	100,000	1	440,000	625,000	Mar. 1904	2.20
Shelby Iron	Ala.	1,000,000	10,000	100	.....	840,000	Nov. 1903	5.00
Sloss-Sheffield, pf.	Ala.	20,000,000	67,000	100	234,500	1,970,500	Apr. 1904	1.75
Somerset Coal	Pa.	4,000,000	40,000	100	80 000	80,000	Feb. 1904	2.00
St. Bernard C. & C.	Ky-Ten.	1,000,000	10,000	100	.....	770,000	Dec. 1903	8.00
Standard Oil	U. S.	100,000,000	970,000	100	15,520,000	223500,000	Mar. 1904	16.00
SundayCreek Coal, pf	Ohio	150,000	1,500	100	.....	15,750	Aug. 1903	3.00
Susq. I. & S., pf.	Pa.	1,500,000	300,000	5	.....	762,500	June 1903	3.15
Temple Iron	Pa.	240,000	2,400	100	.....	21,500	July. 1903	2.00
Tenn. C. I., com.	Tenn.	23,000,000	225,534	100	.....	1,102,600	Nov. 1900	2.00
Tenn. C. I., pf.	Tenn.	248,000	2,480	100	9,920	317,024	May. 1904	2 00
Thirty-three Oil	Cal.	500,000	100,000	5	50,000	200,000	May. 1904	.10
Thomas Iron	Pa.	2,500,000	25,000	200	.....	200,000	Aug. 1903	4 00
Tidewater Steel, pf.	Pa.	600,000	60,000	1	.....	30,000	July. 1903	.20
Union Oil	Cal.	10,000,000	52,672	100	73,740	889,682	Apr. 1904	.70
Union Nat'l Gas.	Pa.	8,000,000	112,500	103	45,000	225,000	Jan. 1904	2.00
U. S. Steel Corp., com	U. S.	550,000,000	5,083,025	100	.....	53,360,978	Dec. 1903	1.50
U. S. Steel Corp., pf.	U. S.	360,281,100	3,602,811	100	12,610,984	105,487,897	May. 1904	1.75
Va.-Carolina Ch., com	U. S.	38,000,000	279,844	100	.....	3,678,829	June. 1903	1 25
Va.-Carolina Ch., pf.	U. S.	20,000,000	180,000	100	480,000	7,500,849	Apr. 1904	2.00
Westmoreland Coal.	Pa.	3,000,000	60,000	50	.....	8,250,000	Sept. 1903	.50
West Shore Oil	Cal.	100,000	100,000	1	10,000	115,000	May. 1904	.05

CANADA, CENTRAL AND SOUTH AMERICA, MEXICO.

Name and Location of Company.		Author-ized Capital Stock.	Shares. Issued	Par val	Dividends. Paid 1904.	Total to Date.	Latest. Date.	Amt.
Amistad y Concordia	Mex.	$480,000	9,600	$50	$45,408	$210,604	Apr. 1904	$1.88
Barreno, g. s.	Mex.	12,000	2,400	5	2,088	66,034	Apr. 1904	.87
Bart. de Medina Mill	Mex.	50,000	2,000	25	6,600	86,328	Mar. 1904	.66
Buena Vista, g. s.	Mex.	100,000	1,000	100	.....	5,000	June. 1903	5.00
Butters' Salvador, g.	Salv.	750,000	150,000	5	36,000	288,000	Feb. 1904	.24
Cariboo McKin'y, g. s.	B. C.	1,250,000	1,250,000	1	50,000	546,837	Feb. 1904	.04
Carmen, g, s.	Mex.	27,500	1,100	25	.....	78,616	Nov. 1903	.99
Carmen-Guanaj. g. s.	Mex.	725,000	145,000	5	.....	27,750	Oct. 1903	.12½
Cinco Senores	Mex.	.....	2,000	.....	.....	711 935	July. 1903	4.10
Copiapo c	Chile	1,125,000	112,500	10	.....	2,865,900	Feb. 1903	.36
Crow's Nest Pass	N. S.	3,500,000	121,486	25	172,524	968,947	Apr. 1904	2.50
Dominion Coal, com.	N. S.	15,000,000	150,000	100	.....	1,050,000	Dec. 1903	1.75
Dominion Coal. pf.	N. S.	3,000,000	30,000	100	.....	2,280,000	July. 1903	2.00
Dominion I. & S. pf.	N. S	5,000,000	50,000	100	.....	875,000	Sept. 1903	3.50
Dos Estrellas, g. s.	Mex.	150,000	3,000	50	66,150	648,975	May. 1904	4.40
El Oro, g. s	Mex.	5,750,000	1,080,000	5	.....	2,514,400	Dec. 1903	.18
Esperanza, s. g.	Mex.	2,275,000	455,000	5	113,760	1,267,949	June. 1904	.25
Fraternal, s.	Mex	5,000	1,000	5	.....	51,263	Nov. 1903	2.18
Granby Con.	B. C.	13,363,030	1,336,303	10	.....	133,630	Dec. 1903	.10
Greene Con., c.	Mex.	8,640,000	864,000	10	259,200	911,920	May. 1904	.30
Guadalupana, g. s. l.	Mex.	15,000	3,000	5	.....	69,930	Mar. 1903	.77
Guadalupe	Mex.	1,000,000	10,000	100	.....	3,515,750	Apr. 1903	.77
Guggenheim Expl.	Mex	17,000,000	105,000	100	367,500	918,750	Apr. 1904	1.75
Le Roi No. 2. g.	B. C.	3,000,000	120,000	35	28.800	316,800	Feb. 1904	.24
Mesquital, g. s.	Mex.	125,000	250,000	½	.....	51,458	Feb. 1903	.06
Mex. Coal & Coke	Mex.	5,000,000	500,000	100	150,000	130,000	June. 1904	3.00
Natividad, s. g.	Mex.	36,000	2,400	15	60,000	332,463	May. 1904	5.00
N. Y. & Hond. Ros.	C. A.	1,500,000	150,000	10	45,000	1,830,000	May. 1904	.10
N. S. St. & Coal, com.	N. S.	5,000,000	50,000	100	123,600	638,600	Apr. 1904	3.00
N. S. St. & Coal, pf.	N. S.	2,000,000	10,300	100	41,200	247,200	Apr. 1904	2.00
Penoles. s. g.	Mex.	125,000	2,500	50	180,000	2,668,114	Apr. 1904	17.60
Providence. g. s.	B. C.	200,000	5,580	5	.....	2,224	Dec. 1903	.10
Providencia (S. J.)	Mex.	90,000	6,000	15	.....	169,740	Feb. 1904	.77
Real del Monte,	Mex.	.....	2,554	.....	11,238	2,038,122	Jan. 1904	4.40
Soledad, s. l.	Mex.	18,200	960	20	21,120	285,332	May. 1904	4.42
Sorpresa, g. s.	Mex.	18,200	960	20	10,572	210,538	May. 1904	2.21
San Rafael	Mex.	60,000	2,400	25	117,905	2,154,422	May. 1904	.....
Sta. Gertrudis, g. s.	Mex.	1,920,000	38,000	50	38,016	2,418,176	Mar. 1904	.....
St. John del Rey, g.	Brazil	3,000,000	546,265	5	.....	14,158,949	Dec. 1903	.12
Sta. Maria de la Paz.	Mex.	.....	2,400	.....	10,480	1,972,853	Apr. 1904	2.18
Torreon Metallurg'l	Mex.	1,500,000	30,000	50	.....	369,500	May. 1903	8.98
Tyee, c	B. C.	940,000	180,000	5	43,200	43,200	Apr. 1904	.24
Union Mill	Mex.	150,000	3,000	50	10,800	424,223	Mar. 1904	1.84

NOTE.—These dividends are published gratuitously. Readers are invited to send any additions or corrections which they think necessary to complete our list.